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PRINCIPLES AND IDEAS FOR DOHERTY MEN

Volume IV

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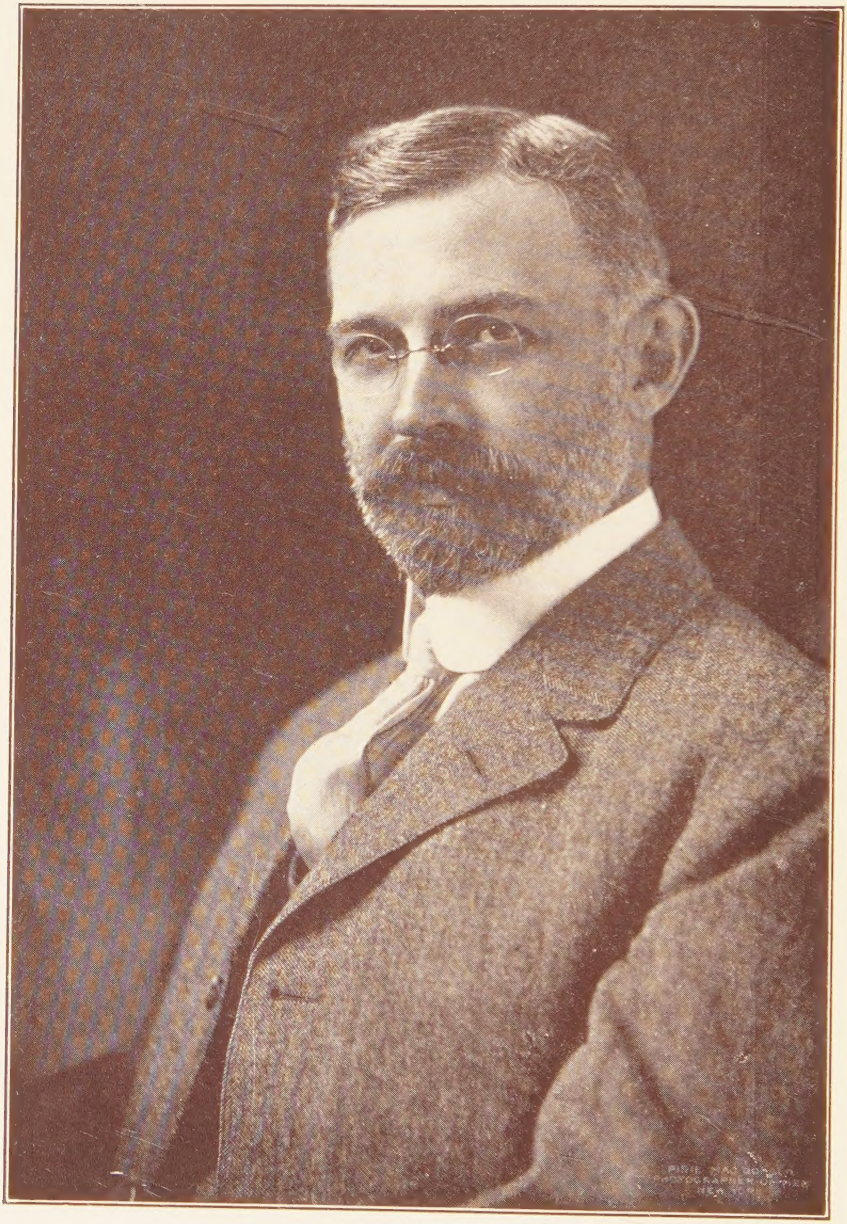

Henry L. Doherty, 1911.

PRINCIPLES AND IDEAS FOR DOHERTY MEN

Papers, Addresses
and Letters by
Henry L. Doherty

Compiled by
Glenn Marston

Volume IV

Printed for the use of
Members of the Doherty Organization
1923

It is well now and then for each man to take an inventory of what he himself has done. What have you done? Have you done something for the world's advancement or have you just trailed along?

—HENRY L. DOHERTY.

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1911

The year 1911 was one of the most important in the history of the Doherty Organization. The newly organized Cities Service Company had to be financed and preparations had to be made for important changes which were expected to occur the following year. The waterpower question was demanding solution, and in this Mr. Doherty took a prominent part.

Mr. Doherty always wants to give the small investor an opportunity for investment equal to that of the wealthy, and for this reason has been a consistent advocate of issuing securities in small denominations. The Bankers' Shares of Cities Service Company are examples of his desire to give small investors an opportunity to buy outright an interest in a large property. The origin of the idea which developed into the War Savings Stamp method of raising money for the Government during the Great War is attributed to Mr. Doherty, and he, with Frank A. Vanderlip, worked out its application in the raising of money for public funds. Financiers of high standing have often opposed the issue of small denomination securities, as this is a method frequently used by peddlers of worthless securities. Mr. Doherty's method overcomes this objection, for his plans always provide for the conversion of a number of small units into a unit of standard denomination. The following memorandum on small denomination bonds contains the germ of the War Savings Stamp idea:

THE remarkable investment and financial strength of France is due chiefly to the distribution of small bond issues among the masses of employees and peasantry.

In America billions of dollars have been lost in worthless securities through the flagrant advertising methods of irresponsible promoters.

By issuing bonds of small denominations in this country the investor with a few dollars may secure safe and profitable se-

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curities, a public benefit will be advanced, and the sacrifice of a nation's savings in wild cat mines, inflated land schemes, etc., will be checked.

The most desirable form of an investment for those who are putting aside and have saved a few dollars, is a Multiple Convertible Bond Certificate. These certificates should be issued in denominations of $10.00 each and should bear interest at the rate of 5 per cent. The convertible feature should be that when ten of these certificates have been accumulated, they may be exchanged for or converted into a $100.00 actual bond bearing 6 per cent interest. Each certificate would be a multiple of a $100.00 bond, backed by a first mortgage on property of unquestioned value. Bonds to the full value of all certificates issued should be deposited with some trust company as an evidence of safety and arrangements concluded whereby the trust company should release these bonds as frequently as certificates were turned in for conversion.

A feature which could be applied in the case of a realty proposition would be to make in addition to the conversion into bonds, the certificates convertible into land at a fixed price per acre if converted on or before a certain period; at an additional price per acre for a longer period. This feature would make the multiple convertible bond certificate more attractive to those who live in the hope that some day, they will own a place in the country, and the percentage of people with such longings is very large, as the call of the wild surges in the breasts of most human beings. The same process of registration, coupon, etc., should be a part of the certificates as well as the regular bonds. In the regular bond issue, denominations of $500 and $1,000 should be included for the larger investors.

> We want the good will and confidence of the people. We are not satisfied with the business we can do as a monopoly. There is a great big world of patronage we can get as a matter of good will and friendship.
>
> —HENRY L. DOHERTY.

An article on gas investments, showing their desirability in relation to other securities and their increasing value, was prepared by Mr. Doherty in the early part of 1911.

OME time ago Mr. W. F. Douthirt, Secretary of the United Gas Improvement Company, and prior to that, a corporation attorney of wide and enviable standing, compiled statistics regarding the value of different classes of industrial investments. This investigation brought out the fact that gas securities had proven the most safe of any securities issued on industrial properties, not excepting railroad and other transportation bonds.

It has only been in the last few years that a recognized market and a recognized clientele has existed for gas securities. This circle is constantly changing. At present a 5 per cent bond on a gas property will sell on as favorable a basis as a 6 per cent bond would sell ten years ago, and many investors are available for the purchase of these bonds. There is no class of securities that now are regarded with as much favor as gas securities, with the possible exception of railroad securities. A 4 per cent railroad bond can be sold on about as advantageous a basis as a 5 per cent gas bond. Statistics will show that gas securities are more safe and conservative than any other class of industrial securities, not excepting railroad securities, and it is reasonable to suppose that in time the investing public will appreciate this and the gas securities will sell on a higher basis per unit of earnings than at present. In other words, the bond which is purchased today at par drawing 5 per cent, will a few years hence sell at a considerably appreciated price, simply due to the more favorable standing this class of investments will have with investors and due to the wider circle of investors in this class of securities.

If gas securities are equally as safe as railroad securities, why cannot their market value be appreciated to sell on a par with railroad securities? This is not a hard question to answer. They can be made to sell on equally as favorable a basis, and it only remains to convince the investor of the true conditions and widen the circle of investors in this class of securities.

The Denver method of soliciting business produces a system of automatic management which insures against unfriendly feeling from the public. The city is divided into a number of districts and each district is cared for by one solicitor and an assistant. This man is virtually the general manager of the company in this district and is expected to know every patron and prospect, to satisfy all patrons regarding any complaints they may have, whether real or imaginary, and secure as much patronage as possible. This man is a trained expert and devotes all of his time to handling people. He must have the friendship of his patrons and prospects to get business or increase the business the company is already getting. His pay depends upon his efficiency as a business getter. This provides an army of trained men with nothing to do but advance the company's interest.

He is one of a large organization which meets daily for educational purposes and the company's interests are looked after by an organization of trained men, while their enemies are unorganized and untrained in the art of handling people. The old idea was to employ as few men as possible, and depend upon making money by economies of operation. This organization of trained men involves a considerable annual expense, and too much for a narrow mind to comprehend. It is an easy matter for a broad minded investigator to determine that the company only has this expense while the organization is being built up and completed. Results already secured will demonstrate that in reality the company pays these men nothing. They get enough business that could be acquired in no other way, and the profits on this business are enough not only to pay all expenses they occasion, but also to pay a handsome return to the city, and looking at it from this standpoint, the public are paying these men while they are working for and directed by the company.

Money making is a question not of ability to invest, but of the wisdom of this investment, and generally depends wholly upon the wisdom to invest in properties whose management is good. Many people have money to invest. Few people have ability for management which insures money making results. Proof of managerial ability can only be demonstrated by results secured.

The great profit made in the financial world goes to the underwriter. He contracts to buy, but in nine cases out of ten he is never compelled to buy. The proposition underwritten is offered to the investing public on less favorable terms than the contract to purchase made by the underwriter. The underwriter makes the big profit simply by being ready to buy, to insure the completion of the deal, and the man who actually puts up the money often makes less than the underwriter who puts up no money. The Gas Securities Company has been organized as a permanent underwriting syndicate in an incorporated form.

You already know how vast fortunes have been built up by the man in a position to be an underwriter. As a rule, no man can be an underwriter unless possessed of great means. By the organization of an incorporated company which will act as the underwriter, this permits underwriting participation by the investor of small means.

Underwriting is the method used to secure greatest return on money employed, because an underwriting application seldom entails an actual investment of any money. To make money on underwriting is generally simply a question of knowing what man or men to follow. Many investors would know who to follow but their means will not permit them to become underwriters.

However, a group of these men could pool their capital to form an underwriting fund of sufficient magnitude to command the respect and attention of the strongest financial houses.

"The richer a man is, the richer he may become" is not true universally, but to a limited extent it is. The real creator of wealth is not the financial man but the creator of things, viz., the engineer and the operator. The man who can create must have the assistance of capital. Naturally he goes where he knows he can find this capital, and it is easier to convince the man possessed of the ability to invest a million dollars than it is to go to 100,000 men possessed of only $10 to invest and convince them of the merits of his undertaking.

The underwriter obligates himself as such only on those transactions which he believes will be readily accepted by the public at a lesser margin of profit. Some propositions are so good that it does not require any great wisdom to see their

merits. Naturally, these propositions go to those who are known to have ability to underwrite them.

The Gas Securities Company is an incorporated company to permit a number of investors to form a permanent underwriting syndicate. Of the profits made by this company, 6 per cent is paid on the money advanced and the residual amount is divided between the investors and the operators.

Opportunities for good investments naturally drift to the center best able to finance them. Something more than mere capital is required. Certain factors are necessary. New York City is the natural place for financial aid to be sought for financing profitable transactions, and Wall Street is regarded as the natural financial center of this great financial city. Therefore the best opportunities for finding profitable investments are in the financial district of New York City. The following factors are generally necessary to a deal:

First, the proposition; second, the promoter; third, preliminary investigator to determine whether the proposition is worth further investigation; fourth, the consulting engineer who makes the physical examination; fifth, the accountant to verify expenses and profit; sixth, the attorney to pass on titles, etc.; after the purchase is determined upon, it then requires seventh, a banking house to put the deal in proper form and to act as syndicate managers; eighth, brokers to secure the underwriting; ninth, underwriters; tenth, attorney to incorporate new company and attend to the issuing of securities; eleventh, brokers to place new securities with investors and twelfth, competent operators to insure profitable operation of property, and not only this, but operators who are recognized by investors as being capable. It is not only necessary to be capable, but it is necessary to have the reputation of being capable.

The propositions come to our office naturally on account of our location, as a concern likely to be able to finance them. We are prepared to furnish the preliminary investigator, the engineering expert for examination, the accounts to verify expenses and profits, attorneys to pass on titles, etc. If a purchase is determined upon, we are prepared to put the transaction in proper form and act as syndicate managers. We are also able to provide some and perhaps all of the underwriting. We have the attorneys and the experience and know

how to incorporate the new company. Many investors seek us for our advice on investments, and we have competent operators to manage the property, and men who are so regarded by many investors. The amount of capital which can be employed in this business is unlimited. Any concern that could finance all good opportunities brought to them with *their own* capital, would have no excuse for being in business. Many people are possessed of capital which they wish profitably to invest. The element that you can furnish to these transactions is the capital. We can furnish or procure everything else which is necessary. We invite capital on the basis of first paying interest on this capital from any profits realized, and then a division of the excess earnings, half to the investors and half to us.

The public believes there has been a movement on foot for many years to reform the corporation.
Don't you believe it.
Those who pose as reformers don't want reform.
They want dissatisfaction and agitation.
If the public wants reform they can do more in a few months than has been accomplished in all these years.
Fourteen letters will spell the secret of success—discrimination.
But the secret won't solve the problem unless it is acted upon.
If a corporation does that which pleases you, give some evidence of the fact.

—HENRY L. DOHERTY.

One of the most difficult problems in finance, and one on which there is wide diversity of opinion, is the provision of a sinking fund to protect the investor's equity in a property subject to depreciation. The following argument entitled "A Plan for a Sinking Fund" is the reproduction of hurried dictation by Mr. Henry L. Doherty in 1911 for submission to a firm of bond dealers in connection with the negotiations of the sale of a pro-

posed bond issue as effecting the provision to be inserted in the trust deed.

The plan proposed and the statement of facts aroused a constantly widening circle of interest which resulted in frequent and still more frequent requests for copies of the originally dictation. At first these copies were supplied by means of the typewriter making as many carbon copies as possible and then as requests became more frequent a duplicating machine was put in use and finally it was printed in pamphlet form.

A discussion by the original author has been added as a conclusion quoting from comments made by those who have discussed the plan.

HE credit of the electric central station business could be materially strengthened by careful financing. Nearly all the conditions which seem to reflect discredit on the central station business are directly traceable to a certain single cause.

The purchasers of bonds on these properties have frequently, and perhaps unconsciously, been in a measure responsible for the conditions which have eventually produced embarrassment.

The interest of the public, the property, the stockholders and the bondholders, are more nearly identical than would seem to be the case from the decided views of each class.

The public are interested in three things—which I will attempt to state in their order of importance: (1) Complete service from a geographic standpoint; (2) Good service; and (3) Low rates. The public are apt to lose sight of everything other than low rates, and yet a city cannot grow to best advantage geographically, or perhaps at all, without an extension of the service of these quasi-public corporations.

A public service corporation is, in a sense, never complete. In selecting a property of this character for purchase the primary object is to secure a property in a city which promises to enjoy a great growth. The great bulk of dissatisfaction, and especially that which has resulted in competition to these quasi-public corporations, has been due to the inability of the company to properly care for the growth of the city.

All quasi-public corporations can materially assist or retard the growth of the city in which they operate by, in one case, anticipating the growth of the city, and, in the other, lagging behind or failing to keep pace with the growth of the city.

During the recent general period of industrial depression—which has resulted in the idleness of 400,000 freight cars to the American railroads—most of the municipal quasi-public corporations has shown a steady increase in gross and net earnings throughout this period They can at least be depended upon to hold their own, even through a panic and about all the suffering they are apt to be subjected to is a diminution in their rate of increase.

If complete statistics were available, I think it could be demonstrated that the municipal quasi-public corporations have proved a safer investment in the past fifteen years than any other class of securities other than state, city or county bonds.

The degree to which an industry is apt to be affected due to a period of industrial inactivity can be roughly measured by the extent to which its product enters into new construction work. The first move on the part of every one in case of a period of industrial inactivity is to cease all construction work, and the enterprises which depend almost solely on new construction work are the first affected, and the worst affected, while the industries which supply an every day necessity are the least affected. The municipal public service corporations supply mainly an every day necessity which is not greatly influenced in volume of business done by good times or bad times.

This is not a matter of guess, but can be demonstrated by the experience of the gas companies in the panic of 1893. The gas companies of the country almost universally made material increases in their net earnings right through that panic; and up to the present time the so-called "Panic of 1907" has simply brought a repetition of this experience.

Some apprehension is expressed regarding the widespread movement providing for state regulation of municipal public service corporations. I do not think any great fear need be felt regarding the outcome of this matter, although unquestionably state control will be extended both geographically and in scope.

The state of Massachusetts has had a public commission in control of the gas and electric properties of that state for a number of years. While it has lessened the opportunity of the companies to disburse greater earnings, it has added a great element of safety to the investor in securities of these enterprises.

Competition is universally recognized as inherently disadvantageous to the public in the long run, and the establishment of state control of quasi-public corporations is a protection and guaranty against competition.

In the establishment of these commissions for the regulation of quasi-public corporations it is also understood that, in the interest of public policy—and regardless of previous laws to the contrary—each property inherently possesses a franchise without limit as to time; and it is highly probable that during the next few years this principle will be universally recognized, not only by students of economics, but by the courts. The expiration of a franchise will simply mean an agreement regarding the terms under which a company can do business; and in no case will the expiration of a franchise be interpreted as an expiration of the right to do business. In fixing the conditions under which the company can continue to do business a reasonable rate of return on the money invested is assured by the Fourteenth Amendment of the Constitution of the United States.

If the public is to be served in a satisfactory way, the company must be in position to maintain complete service from a geographic standpoint, good service and low rates. Failure to properly serve the public has resulted in public dissatisfaction—which has produced attacks by newspapers and municipal authorities and encouraged would be competitors, and has frequently jeopardized the interests of both the bond and the stockholder.

Lack of appreciation of some of these points has prompted bond buyers to insist on restrictions in the mortgage, which added but little in any event to the security of the bondholder, and in many cases have proved an extreme hardship to the company, and frequently have introduced obstacles which were directly or indirectly the cause of jeopardizing the interests of the property.

For the period between 1890 and 1900 the average growth of the cities of this country was approximately 3 per cent per year. Some cities have grown at a rate of 10 per cent or more per year. No matter how rapid this growth may be, the municipal quasi-public corporation must be in position to at least keep pace with this growth if it is to properly serve the city.

The greatest activity in the organization and exploitation of these municipal public service corporations is necessarily confined to those cities of greatest growth. It would not be safe to assume that any of these cities were going to have a growth of less than 4 per cent per annum. A growth of 4 per cent per annum means compounding the population on a 4 per cent basis. This growth, however, does not take place uniformly each year, and while it cannot be considered as averaging less than this amount, it at times greatly exceeds this amount, and the company must be in position to take care of, not the period of average growth, but the period of greatest growth.

In addition to this growth of population the uses for the service of the quasi-public corporations are increasing rapidly every year on a per capita basis. Only a few years ago sales of $4.00 per capita for gas were looked upon as exceptionally large, while today many companies even in the interior of the country are selling $7.00 worth of gas per capita per annum. In electric service a few years ago $2.00 per capita was looked upon as a fair amount, while today many of the central stations are selling as much as $8.00 per capita.

If we assume that a property is to be mortgaged to take care of say 60 per cent of its original cost, to take care of the extensions, and to take care of a population growing at an average rate of 4 per cent during the life of the mortgage (which we will assume to be 30 years), and if we assume that the need for new money will increase no more rapidly than the increase of population, we then have a condition which would require the authorization of a bond issue 3¼ times the amount to be originally issued. That is, on this assumption alone the issue of $1,000,000 originally would require an authorized issue of $3,250,000

It is not unusual to see these bond issues limited to an authorization of perhaps 40 or 50 per cent more than the initial

issue. This means that with the average growth of cities, and the most indifferent development work, at the end of 10 years they have issued all of their bonds. They must then buy up these bonds at a premium and authorize a new mortgage for a larger amount, or issue a general or second mortgage bond—which is not readily salable.

Some bond houses are apt to look on this short sighted policy as an excellent method of creating business for them. The reverse is apt to be true. As the bond issue approaches the point of being nearly exhausted the company commences to curtail on the necessary extension work, thus limiting the earnings of the company, inviting attack and possible competition. While this policy causes the creation of more bond issues, it is doubtful whether it increases the total number of bonds to be sold. At any rate, it is a great factor in lessening the credit of municipal public service bonds and diminishing the number of possible purchasers.

It is also becoming customary to inject into these bond issues a number of features intended for the protection of the bond buyer, such as (1) a retirement or sinking fund, (2) inability to issue bonds for more than 80 per cent of the new moneys expended, and (3) to forbid the issue of additional bonds unless the earnings of the company for the past twelve months will show at least double the interest on the bonds outstanding and to be issued. These clauses, under certain circumstances, add an element of weakness to the security of the bond purchasers rather than an element of strength.

A sinking fund or retirement fund, added to the necessity of extensions in a rapidly growing property, is apt to render the company powerless to make extensions to its service as rapidly as demanded; and, in addition to this, it is regarded by would be competitors as a form of a fixed charge and is apt to encourage them to enter into competition with the established business.

A sinking fund or retirement clause is the most beneficial to the interests of the bondholder and the least harmful to the company of any of these three usual provisions. A combination of the three clauses is apt to be more of a load than the enterprise can stand; and while none of them would react with such remarkably bad effect alone as is sometimes the case when they are taken together, it would seem possible to hit upon some

happy medium which would render to the enterprise the greatest degree of freedom and yet insure to the bondholder the greatest possible degree of protection.

The tendency of all municipal public service corporations is to appreciate in value in relation to its physical property rather than to depreciate. As gas pipes and conduits are laid down, and permanent city streets are laid over them, the cost of duplicating the service is enormously increased, and the value of the existing property is to that degree enhanced without any expenditure on the part of the company.

The greatest element of weakness in these various clauses is the fact that the bondholders cannot in any way compel the company to serve the public as anticipated in its franchise grant —and these clauses discourage the company from doing it rather than encourage it in doing so.

If a company should make large expenditures of money, and can issue only 80 per cent in bonds for each $1.00 expended, it is often possible that the entire earnings of the company, without the payment of any dividends on stock, will not pay the difference between the amount yielded by the sale of this 80 per cent of bonds and the gross expenditure needed. The company therefore defers these extensions, to the jeopardy of all; and in case the city is going to do an immense amount of paving, it often neglects to lay down its conduits or gas pipes at a time when it can do so with the greatest economy.

Again, if for any reason the company's earnings are depleted, it can, by judicious expenditures, materially increase the rate of earnings on the entire investment; but if its earnings have already been depreciated to a point where additional money cannot be secured by a sale of stock, and the earnings do not provide the necessary difference between the amount realized on the bonds and the cost of extensions and enlargements, then these extensions or enlargements, which might be the redeeming feature, are not made.

The last paragraph applies particularly to the limitation of being unable to issue additional bonds unless the earnings of the company for the past twelve months will show at least double the interest on the bonds outstanding and to be issued.

Where a company is bonded to an amount above the tangible value of its property each $1.00 expended for physicial property,

if only $1.00 in bonds is issued therefor, tends to lessen the percentage of this intangible value, and thus gives greater protection to the entire bond issue as a whole.

In fact, the only time that these last two protective clauses are needed is when the property is not doing well—and these very clauses may prevent the company from getting back on a sound basis.

Clauses which forbid the issuance of bonds except on a low value tend to discourage extensions of the property rather than induce additional money to be put in from some other source.

The application of heavy burdens on the part of the bond purchaser is apt to discourage the execution of the work on a proper and comprehensive plan and prevent the proper choice of property and equipment.

As an example, let us assume a combined gas and electric plant in a city of 100,000 population. We will say that the company is doing a business of $2.50 per capita in the electrical department and $3.50 per capita in the gas department, or a total of $6.00 per capita, or $600,000 per year. Let us assume that the cost of the property has been $5,000,000, and that the franchise has 35 years yet to run. We will also have to assume a fixed relation between additional investment and increased gross earnings. Taking large groups of properties over long periods of time, an allowance must be made of at least $4.00 in increased investment for each $1.00 of additional gross revenue. The trend of prices is constantly downward, and for this reason to be safe something more than $4.00 per $1.00 of increased revenue should be allowed.

We will assume that the property is to be initially bonded for 60 per cent of its cost, or a total of $3,000,000. We will assume a growth of 4 per cent per year on the average, and a bond issue of 30 years' time. The population of the city would increase on a 4 per cent basis from 100,000 to 325,000 during this period of 30 years. Some cities are already selling more than $12.00 worth of gas and electricity per capita per year. If we assume in addition to this growth of population that the sales will increase from $6.00 to $12.00, the revenues of the company will increase from $600,000 per year to $3,900,000 per year.

The additional investment required will be $13,200,000, and if this were all to be made by the issue of additional bonds it

would require a total authorized issue of $16,200,000, or a relation of the initial issue to the total issue as 1 is to 5.4. If 80 per cent only of this extra investment was to be provided from the sale of bonds, then it would require a total authorized issue of $13,560,000, or a relation of total authorized issue to initial issue as 1 is to 4.52.

These figures, I think, demonstrate the fact that the authorized bond issue is almost always too small, and is not influenced by any form of computation but simply a guess.

If the issue of these additional bonds is properly safeguarded there can be no possible objection, as far as safety to the bondholder is concerned, in authorizing an issue of bonds amply large to take care of the future needs of the property.

In this particular example that I have just cited I have assumed that the company's gross earnings were $600,000 per year, and will assume that its net earnings are $300,000.

If there is no sinking fund provision, or provision that only 80 per cent of bonds can be issued for each $1.00 of improvements, and that these bonds can only be sold for 90 per cent of par, then for each $1.00 expended for extensions of the property only 72 cents can be realized from the sale of bonds, leaving 28 cents on each $1.00 expended to be provided from some other source.

This would permit the company to expend $535,000 per annum on the development of the property if nothing was allowed for a sinking fund and no dividends paid. If a 5 per cent dividend was paid on the stock, and no sinking fund was deducted from earnings, it would enable the company to expend about $180,000.

Roughly speaking, about 30 per cent of the gross receipts of a combined gas and electric property must be used for extensions and enlargements. If a sinking fund of 1 per cent was required before any dividend was paid, and a 5 per cent dividend was also paid, the company could then expend only about $70,000 for extensions and enlargements.

In case of a growth such as has characterized Los Angeles and many other American cities, the company would be totally unable to keep up with the growth of the city without securing funds from some outside source, even though no dividends were paid on the stock.

The only city where the bondholder need become particularly apprehensive about the security of his investment is the one in which no growth takes place. In this city the 80 per cent clause is no hardship to the company nor of any benefit to the bondholder. The stipulation regarding requirement of double earnings for the past twelve months on bonds outstanding plus bonds to be issued is also of no benefit to the bondholder or any hardship to the company.

My idea would be to correlate all of these features in such a way that under the worst conditions imaginable the bondholder would be amply cared for and under no condition would an undue hardship be placed upon the company.

My idea would be to compel the company to either pay a fixed amount of money into its sinking fund or to expend a fixed amount of money on the extension of its property. In this way the bonded indebtedness of the property is either constantly diminished or the tangible assets on which the bondholder holds a mortgage are constantly increased. The amount would be fixed in character, and the company would know what to count on, while the bondholder would know that he was either continually getting greater security for his money or that the total outstanding bonds were constantly being diminished.

The term "sinking fund" has been rendered almost meaningless by making it apply to any form of retirement of bonds as well as to a true sinking fund in which the bonds are kept alive and the interest on the bonds purchased for the fund is constantly used for the retirement of additional bonds.

If the company's greatest ability to extend its property or reduce its mortgage is exacted, then it can do more by the use of a true sinking fund than by any form of bond retirement, unless created along the same curve as would characterize a sinking fund. This would make a confusing retirement clause, much more complicated and less desirable than a sinking fund.

The property can always be depended upon to have some considerable value, and in no case is it necessary to provide for the entire wiping out of the bonded indebtedness.

My idea would be to adopt a sinking fund only in place of the three usual provisions. This sinking fund would be so construed that it could be either an addition to the property or a payment to the fund. On the basis of a 5 per cent, 30 year

bond, a sinking fund of .75 of 1 per cent would reduce this bond issue to one-half its original value.

My idea would be to insert a sinking fund of this sort, and provide that if the company expended double this amount on its property each year the sinking fund would not be operative; or in any year the company expended more than this amount it could take from the money already placed in the sinking fund; but at the end of any period the company would have either paid into the sinking fund enough to reduce the mortgage to one-half its value at its expiration or would have put enough money into the property to give the bondholders twice the value of the original property.

> I would prefer to have men think I can make better men of those who work under my direction than to be known as a man who could pick the winners.
>
> —HENRY L. DOHERTY.

The Stock Exchange speculator does not interest Mr. Doherty —he seeks investors who are looking for intrinsic worth and earning power behind securities regardless of temporary fluctuations of the market. The following letter was written by Mr. Doherty to an investor, in May, 1911, regarding the business and financial outlook at that time:

My dear Sir:—

I thank you for your expression of confidence in my ability to analyze the present situation, based on the correctness of my former analyses made for you. I do not pretend to know what the markets may do over short periods of time, as sentimental features play a more important part than intrinsic features from day to day and from month to month, while over a long period of time the market situation can always be correctly analyzed if the general prevailing conditions in the industrial field can be clearly foreseen.

It has also been my observation that even the wise heads seem to disagree, and all seem rather doubtful of the outcome of the present situation; but it must be remembered that most

of these men are studying the problem from a stock exchange standpoint.

Eliminating the stock market, speculation and speculative securities, I can safely predict, in general terms, the industrial and financial conditions for the next two years; and my predictions, if given proper consideration, will receive the endorsement of your other advisers.

At the present time we are feeling the effect of the results of the past ten years, all of which time we have been creating securities at a more rapid average rate than the market would absorb. This applies not only to this country but to other countries as well. We can draw arbitary lines to govern political activity, but we cannot restrict financial activities to these same political boundaries; and in financial matters the tendency is to continually still further erase these political lines.

Our country has produced a vast portion of all of the new securities of the world during the past decade, and during the past eight years at least the attitude of our national and state governments, and the press, platform and pulpit, has been of a character which has curtailed the absorption power of the investing public of this and other countries. This over-production in relation to the demand has carried all classes of securities to new low levels. Any deviation from this general slump is due to special conditions as affecting a particular security or a particular class of securities. During the past six months we have seen British Consols sell on about a $3^1/_4$ per cent earning basis, as against 2.67 per cent in 1903. This means a depreciation of 20 per cent. New York City bonds are selling now on a 4.1 per cent earning basis, as against 2.45 per cent in 1889. This means a depreciation of 31 per cent in market value. Bonds of the City of Cincinnati are selling upon a 3.85 per cent earning basis as against 2.97 per cent a few years ago. I think it is safe to assume from the vast array of evidence before me that all securities, as an average, are 20 per cent below their normal value.

We have now reached the first of May, and up to date little has been attempted, or even planned, in the way of the creation of new enterprises. Industrial activity is far below normal. We are approaching the usual summer lull, and I think there is little probability of new enterprises being attempted, or con-

sidered, until after the summer vacation. We will then be within approximately a year of another presidential election, with opportunities for happenings within the coming year to make any prediction as to the outcome of this election exceedingly doubtful. This means that for fully two years from this date we are pretty certain to have a degree of activity in regard to the creation of new enterprises and the creation of new securities which will be far below normal.

During this period there is a large amount of refunding of outstanding securities to be done. This does not mean a strain on the financial situation, but simply a trading of money back and forth without taking it from the usual banking channels.

If my prediction is so far correct, it naturally follows that we have ahead of us at least a two year period of easy money. We may have temporary stringencies, but if we do I think it will be due to artificial rather than natural conditions. There is no reason why we should have tight money due to the movement of the 1911 crops.

A long period of easy money such as this would ordinarily tend to create industrial activity, calling for the creation of many new enterprises; but with the summer lull immediately ahead of us, followed by a very short period before we will be in the midst of another presidential election, coupled with the greatest doubt that has ever confronted us regarding our future tariff restrictions, makes to my mind almost a certainty that commercial activity will be far below normal; and also means that new securities will not be created at anything like the natural rate of absorption, even considering the lesser buying power of the investing public.

There is another thing which seriously interferes with the creation of new enterprises. By discrimination, safe and conservative preferred stocks can be purchased on the present market at 7 per cent, or better. First class bonds can be purchased at a price which will yield attractive rates of interest, with almost a certainty of an enhancement in market value. Short term notes, of unquestioned safety, can be purchased on a 6 per cent basis, or better. And these opportunities render a subscription to a new undertaking relatively unattractive, unless of exceptional worth. In other words, investors can have seasoned, safe and proven securities on an earning basis which

exceeds the rate promised on many of the enterprises which have been established in the past few years.

During the past decade much of our favorable markets have not been of a reasonably proper character. Securities which should have been absorbed by true investors were absorbed by speculators in the belief that the markets would go still higher. We have in our markets today immense quantities of securities that must be digested, not by speculators, but by true investors. The price of these securities has reached a point, in relation to the value of money as money, that is bound to produce an exchange; and the man with idle money will profit the most who invests it the most quickly, if he does so with reasonable wisdom.

The security market may not have yet reached its absolutely lowest level, but I think there will be far more money lost by waiting for new low prices than by availing one's self of present opportunities; and regardless of any new low level which may be reached, there are plenty of securities now on the market which are a splendid purchase at present prices, which an investor can put away in his safe deposit vault, feeling that he has made a good investment regardless of what the market does in the next few months.

There is no reason why lower prices should prevail. Our financial conditions were never so sound and money was never so easy as at present. Our crop prospects are splendid; and, as I see it, without artificial manipulation, it is hopeless to expect any higher rate of interest return on deposits or loans, and every prospect of a less favorable opportunity for the loaning of money at favorable rates.

Such a condition is bound to produce the purchase of interest bearing paper in the form of coupons or dividends. It is the selection of this paper that calls for wise discrimination. Many of the railroads and industrial companies are financing their present needs by the sale of short term paper. They are doing this because they believe at some future time they can market their bonds to better advantage than at present. I am not opposed to the purchase of short term paper, but the very reason that short term paper is desirable for the enterprise makes it undesirable, in a way, for the investor. If when this short term paper becomes due the enterprise can sell a bond

at ten points above the present market it means that when this short term paper is paid off the investor can only buy a bond at ten points above the present market. If those of us who are putting out short term paper are right in our ideas of what the future will bring forth, then the investor should be seeking good low priced bonds at this time rather than tying his money up in paper which will only come due when bonds have reached a much higher level. In one instance short term paper is being put out by one concern for the sake of buying up bonds that are already in the hands of investors, but which have a low market value at present.

The very conditions which confront us call for caution in the purchase of certain securities to avoid a loss. If we are to have two years of low production the earnings on the common stocks of many companies will suffer severely, and we cannot expect these stocks to show an increase in market value, or perhaps even hold their present level. The continued earnings on the stocks of various enterprises can be roughly determined by the extent that the finished product of that enterprise depends for its sale upon the carrying on of construction work at normal rates. In other words, generally speaking, the thing for the investor is either bonds or preferred stocks that have a safe earning capacity above the amount required to pay interest on the bonds or pay dividends on the preferred stocks, and common stocks should be bought only in those enterprises which are not seriously dependent upon new construction work.

Summing up my analysis, I would say,

First: That in all probability we have two years of comparative inactivity ahead of us.

Second: That we probably have two years of easy and cheap money ahead of us.

Third: That the existing market value of true investment securities is from 20 to 33⅓ per cent below normal, and that during this two year period we will see a substantial recovery in market value by this class of securities.

Fourth: That there is no reason to expect anything in the nature of a panic or general hard times.

Fifth: That the next two years will see fewer investment securities created than the market can absorb.

SIXTH: That every condition we can see makes the market ripe for the purchase of investment securities at this time.

I know nothing about manipulation of stocks or securities, and I always contend that the general public frequently mistake anticipation for manipulation. I believe that my analysis is correct, and if acted upon will enable a handsome return to be earned by anticipation and not by manipulation.

After reading this letter I will be glad to have you give me your criticisms and comments.

Yours sincerely,

HENRY L. DOHERTY.

> I consider the business man's service the best thing for the welfare of the world.
>
> —HENRY L. DOHERTY.

A summary of the financial situation was made for a financial news service by Mr. Doherty in May, 1911, which was widely published throughout the country. He said:

ABOUT a year ago I called attention to certain facts regarding gas and electric securities. I pointed out:

(1) That the interest recently manifested in quasi-public corporation securities was not new, but simply more general; and

(2) That if statistics mean anything, these securities, as a whole, are exceptionally safe and deserve the attention and confidence of the investing public to a greater degree than any other class of securities, excluding only governmental bonds, in the broad sense of national, state and municipal bonds.

I called attention to the general upward trend in the value of these securities, and gave as the primary reasons for this general upward trend the fact that our census reports show that our American cities are growing at a rate of about 3½ per cent a year; and this means that the average city should double its population about every twenty years.

I also called attention to the fact that the gas and electric business was able to maintain increased net earnings even dur-

ing periods of business depression and during panics; and gave as reasons for this (a) that the bulk of all the sales represent an every day necessity and are not greatly influenced by an expansion or contraction in our general business condition; (b) that as these companies will sell their service at a fixed price, both in times of prosperity and in times of depression this tends automatically to prevent excessive earnings in time of great activity and guards against a loss of earnings in times of business depression; and (c) that during times of prosperity the prices on raw materials which these companies buy advance in price, while the selling price of both gas and electricity remain the same, and during times of business depression those companies can buy their raw materials at a much lower price, thus tending to work toward a constant net earning power, which is increased by the growth of population and by the continual new uses found for both gas and electricity.

These facts (and I believe they are facts and will be borne out by an independent investigation) deserve more consideration today than they did a year ago; and relatively I think these securities should, in the light of our present situation and immediate future, be held in higher favor than at any previous time.

> There is no occasion when a condition is changed that a new opportunity does not present itself.
>
> —HENRY L. DOHERTY.

A "yellow sheet" containing memoranda in preparation for an address on "Saving" comes from Mr. Doherty's 1911 files. It says:

(1) Saving develops careful living.

Self-control, chief among moral treasures, is its underlying principle.

(2) Saving enhances daily comfort.

No slavery is so burdensome as debt; saving cancels and forestalls it, produces a peace of mind unknown to him who, in time of misfortune, must depend on the bounty of his friends.

(3) Saving provides for the future.

Cash capital is a necessity in starting business, and saving creates capital.

(4) Saving establishes credit.

The habit of saving is an indication of thrift and an evidence of character.

Lay aside some portion of your income.

Think whether the dollar will be more useful now than it will be later when it has increased to ten dollars or more.

Sacrifice small present pleasures for greater future good.

When income increases don't spend all of the increase.

Saving does not necessarily mean discomfort, but it insures continued comfort.

The saving habit tends to better one's moral condition for it teaches moderation and restricts the expenditures. It is one of the lessons in self-mastery that yields a return in actual cash.

Be your income ever so small, your expense may be less. Begin to save. Persevere for a little until habit, that wonderful conservator of nerve-force and energy, takes the matter in hand and the victory is won, the foundation of a fortune is laid. Thenceforth the ingenious figuring necessary to make one dollar do the work of two becomes a pleasure; for the natural pride in a thing well done applies just as truly to saving money as to building an engine or writing a book.

Make your money work for you.

Heretofore you have been working for money—have perhaps been its slave.

Turn the tables, make your money work for you, make it your servant and it will surprise you what a faithful servant it will be and how much it will earn.

The world takes good care of those who care for themselves.

To provide for the future is a part of one's responsibility in life; and the world at large has scant courtesy for the man who neglects it.

Money well invested will make money just as surely as seed sown will raise a crop.

A farmer looking for a crop without first sowing the seed, would be thought a fool, but would be no more a fool than he who expects luck to bring him a fortune without having sown the seed of his savings.

Money is more than gold or silver. It is the measure of brain and muscle that has been spent. Savings therefore are youth and energy stored up for future use.

More than that, this stored up energy goes on working, it works while you sleep, on Sundays and holidays—every day in the year.

It is often said "Opportunity makes the man." It might as well be said "Money makes the opportunity" for, in proportion as a man's wealth grows, his opportunities increase.

"Providence does not provide for the improvident."

"We are ruined not by what we need but by what we think we need."

> One secret of personal happiness is to try and concede good motives, rather than bad motives to others.
>
> —HENRY L. DOHERTY.

Another "yellow sheet" containing Mr. Doherty's thoughts for an address on "Investment by Employes" says:

HE recent appeals of large railroad corporations to their employes to practice daily economy in the interest of the companies have been very striking.

Some roads have asked every employe to save for them at least five cents a day.

One of the large systems has prepared an interesting table illustrating the difficulty of earning money and the ease with which it may be spent.

To earn a two-cent stamp, the road must carry a ton of freight three and one-half miles.

To pay for a lead pencil it must haul that ton two miles further.

The ton must be carried ten miles to pay for a pound of waste, seventy-five miles to pay for a red lantern globe and a hundred miles to cover the cost of the lantern.

Carelessness of employes in the protection and use of property affects vitally the financial prosperity of the road, may impair its ability to pay dividends and delay or prevent entirely a fair increase in wages.

In countless ways it will tend to injure the best welfare of employer and employe.

But economy will spell success.

Money and material should not be wasted, they are too valuable.

The worth of money should be measured not by what it will buy but by what it will earn.

A dollar invested at four per cent must work for six months to earn a two-cent postage stamp.

The quarter wasted—spent foolishly or unnecessarily—requires a dollar to remain in savings bank several years to restore it.

This same principle of economy should be followed by every individual in his personal affairs.

If you spend unwisely ten dollars of the hundred which comes to you today the other ninety dollars must work a long time, if safely invested, to win back that wasted ten.

"All my life I have lived from hand to mouth. As time advances, the distance increases."

This was said by a working man and the pathos of the expression secured him a job. But not every one who feels the burden of advancing years can secure employment by using this sympathetic appeal.

There is possible, however, to every worker, freedom from the sorry plight of dependency in old age.

Get the habit of saving.

Spend less than you earn.

Have the purpose—stick to it, make the effort—*get the habit.*

You will enjoy the experience, will get a better grip on life, will take a keener joy in earning and derive more pleasure in your spending.

True economy is the intelligent practice of self-control—not self-denial—wise, not foolish expenditure of money—the happy medium between penuriousness and extravagance.

To live up to one's income is dangerous—to live beyond it is dishonest.

To live safely within one's income makes the present secure and safeguards the future.

He who earns much but saves little is not prosperous.

Real prosperity consists not alone in "doing well" but in doing well with what one has to do with.

The measure of prosperity therefore, is not what one earns, but what one saves; not what temporarily one may have, but what permanently one retains.

During 1911 Mr. Doherty was so busy with financial matters that he had time to attend only two association meetings. He took a "vacation" in Europe which was chiefly devoted to establishing a market for Cities Service securities. At the meeting of the American Gas Institute he was called upon by the president to discuss one of the papers.

HE PRESIDENT: I should like to hear from Mr. Henry Doherty on this subject ["Some Principles of Condensation With Especial Reference to Water Gas"].

Mr. Doherty: Mr. Chairman, the paper under discussion deals with a process of washing and scrubbing gas, of which I am the inventor. I am not responsible for bringing it before the association and do not want to take any part in exploiting it.

The President: You must not be too modest; go ahead and tell us about it.

Mr. Doherty: In a general way the results reported by Mr. Worthing are just about what we are getting elsewhere and what was expected. My method of treating the washer cooler would be an entirely different method from the one which he has used, and I doubt if I could throw any particular light upon it without going into a discussion of much greater length than I care to go into at this time.

In the first place, there are a few principles that are worth special consideration. First, in place of circulating a large mass of cooling water in contact with your gas, you circulate only the amount of cooling water which is represented by the condensation that comes from your gas; that is, all of the cooling water that is discharged from the system and that might carry away benzol or other valuable compounds is limited simply to that which is condensed. If you bring your gas pretty well down to that temperature before it enters the washer cooler the amount of water that is discharged is relatively small. If you did not have to discharge any water at all, then the water present would soon reach saturation and then no more illuminants would be taken up.

The other important feature is this, that the system as carried out brings about the transfer of heat from water to water instead of from gas to water, as is usually the case. The effi-

ciency of a heat transferring surface varies tremendously with the medium on each side of it. For the same general condition you may assume that the rate of heat transfer per B. t. u. per square foot per degree per hour will be about 1½ B. t. u. when transferring heat from gas to gas. When you are transferring heat from gas to water you will secure a transfer, we will say, of 2½ B. t. u. per square foot per hour. When you work from water to water—and this process transfers your heat through a diaphragm from water to water —you get an efficiency of transfer of about 150 B. t. u. per square foot per hour. You get that with a clean gas and a clean water. Working with a dirty gas and a dirty water, we have got as low as 39 B. t. u. You could get a deposit CO so thick that it would be even lower than that, but the lowest we have so far is 39 B. t. u. Now, that means a very much smaller equipment, much less surface, and as you get direct contact between your water and your gas, you can get just as large superficial area there as you want, finely dividing your streams of water and gas and bring about just as intimate a mixture between your gas and water as you wish.

This is a system of washing and cooling which we have gotten up and have used practically in our own plant. A few people have used it besides ourselves. We have not tried to exploit it, but have simply used it as a means of cutting down the amount of scrubbing and condensing surface and getting better condensation results. It is used more extensively by the Semet-Solvay Company than it is in our own plants. We use it universally, but as they make much more gas, they use it to a greater extent than we do. We find that we can use it if we want to as a tar extractor, in addition to using it as an ammonia scrubber. In other words, we can make this apparatus take the place of every piece of apparatus between the hydraulic main and the purifier. Now, we are not advocating this practice. The system as set forth here is applied to water gas and the complete system as applied to coal gas is very much more extensive than has ever been published, and it would be an injustice to the system to describe it in an impromptu talk.

I don't like to break the rules of discussion, but one very important point has not been brought out and it may be of advantage to know what it is. We have found in holding the candlepower that it is very valuable to get our tar out of contact with

our gas circulation. By using a type of machine like this the tar is seldom in contact with the gas long. It is settling in the basin in the bottom of the cooled chamber and is not exposed, as it is in the tar extractor, where the surface keeps on absorbing the illuminants. In this process the tar is precipitated from the gas and is separated from further contact with the gas by a superimposed layer of water. The tar does not come back into the circulation and the water does.

* * * * * * *

It is a very easy matter to discuss the results obtained in these various carbonizing systems and yet never get anywhere, because we talk about cubic feet of gas in one case and candle-power and pounds of tar in another, and we say nothing about what that tar contains. It is my belief that instead of being a difference in the results secured it is a difference in the division of the products; that is, in some cases what would go to your gas goes to your tar, so that you get so many gallons of tar without showing the nature of that tar and how much it contains in the way of illuminants, so it does not give you any basis on which to compare.

I went away this summer on a vacation. While I was away I dropped in on a meeting of the British Institution of Gas Engineers, and they had a very animated discussion in the convention hall and a great many more animated discussions outside of the convention hall. The bone of contention between the various debaters might have often been settled by a standard method of determining the results obtained by carbonization.

While ordinarily the man who suggests a committee has to engineer it and do the work on it—I cannot do that—I think the first thing that this gas institute should do is to appoint a committee to standardize our methods of testing for carbonization, because if we do not do that we shall never be able to reach a conclusion. For instance, Mr. Fulweiler called attention to the results obtained in candle-power at Manchester, which is probably due to the polymerization of the products in the top of the retort, and what ordinarily would go to the tar in the form of illuminants is given to the gas instead of the tar. It is not only an ordinary distillation process of a fixing process, but also polymerizes it so that it would ordinarily be so heavy that it

would be liquid and become gaseous at ordinary pressures and temperatures.

While I am on my feet I want to call attention to one or two interesting things that I saw abroad. I noticed in one gas works where they were using outside generators—and they were doing that primarily to economize on labor—that it would have been a very easy matter for them to reduce their fuel cost enough to have completely paid their labor bills. That is, they were spending more for furnace fuel than would have been necessary by the best practice to an extent equal to the full cost of their labor.

The results secured in Europe by almost any system of carbonization today have brought the labor cost to a very low figure, so that important cost now becomes the fuel cost. On the other hand, the labor costs as given in the various reports are somewhat misleading. I was in one retort house where one man apparently was doing all of the work in the manufacture of 750,000 cubic feet of gas. Outside there were two men to take care of the coke coming from the retorts; two other men outside were engaged in picking over the furnace fuel to recover the carbon. They were trying to reduce their furnace difficulties by the use of a large amount of water and steam, with the result that a large amount of fuel passed through without burning—to recover that fuel they were picking it over. It was rather interesting to see two men picking fuel from a retort house that was run by one man.

A great many of the high economies secured in Europe in every direction are secured not as commercial, but as technical economies, while in America we strive more for commercial economy, and I think that nearly all of the reports they make over there, while they are intended to be strictly honest, are made on a basis that you are not safe in accepting unless you investigate further, unless you are sure that you know all of the conditions.

When they talk about the efficiency, for instance, of heating apparatus using gas for fuel, they take what is termed the net value of the gas; that is, they deduct the heat of condensation of the water, and yet often you will see them working with some sort of a system that uses part of that heat of condensation and they only charge off to their apparatus the net value of the gas. In other words, they work with a method that would be capable of giving them more than 100 per cent apparent efficiency. I

have been really interested in the large production of gas which has apparently been secured in many coke oven processes from a very low volatile coke. As a rule, we do not stop to compare the character of the coal, but we are in the habit of considering that it is only so many cubic feet per ton. When you try to make a calculation to indicate the yield that we should get from a high and a low volatile coal, the yield that we get from the coke ovens is really quite remarkable and that is one of the things that ought to be taken up in the standardization of the methods of determining the results of carbonization.

I call attention to the fact that a great deal of the difference in results was due to the division of the products between the liquids and the gases; that is, between the gas and the tar. I might also call attention to the fact that it is not a very hard matter by poor methods of scrubbing and condensing to reduce the candle-power as much sometimes as two, three and four candles, and in one particular case that is not before this body for consideration the poor results on candle-power in a certain system are due entirely to the very poor system of scrubbing and condensing. The people who are exploiting that system apparently know nothing about scrubbing and condensing and are getting bad results in spite of the fact that they should get very good candlepower gas from the method of carbonization. The one thing I want to leave in your minds is the necessity of standardization of the methods in which we state the results of carbonization work.

Monthly dividends tend to maintain both equilibrium of stock valuations and equilibrium of money market. Speculation thrives on violent fluctuations. Sound prosperity is fostered by stable and uniform conditions. Given greater equilibrium of money conditions and stock valuations, a large proportion of the public could be induced to become shareholders.

—HENRY L. DOHERTY.

As Chairman of the Power Transmission Section of the National Electric Light Association, Mr. Doherty was called upon to preside at a public conference on water powers held in New York and attended by the leaders in the public utility industry as well as by many public officials. In his opening remarks he said:

THIS is a public conference on "The Proper Attitude of the National and State Governments Toward the Development and Utilization of Water Powers," and is called under the auspices of the Power Transmission Section of the National Electric Light Association.

The National Electric Light Association is an organization of corporations and individuals engaged in the electric light and power business, and it now has to exceed 7,000 members and represents over 80 per cent of the money invested in the electric light and power business in this country, being in excess of two billion of dollars in money value. It is a body organized not for profit, but to encourage the development of the art of electric service from central station plants along broad and comprehensive lines, which will bring benefit to the members of this organization and to the public.

The Power Transmission Section of the National Electric Light Association, organized at the St. Louis convention, 1910, "is open to all individuals who are members of or entitled to membership in the association. Its prime objects are to promote the best conservation and utilization of public and private waterpowers and other natural sources of energy; to determine and advocate the proper attitude of the national and state governments for the purpose of encouraging such development; to study from every standpoint of section usefulness the political, social, economic and financial problems bearing upon the cheap, efficient and uninterrupted delivery of transmitted energy to the distant consumer; to perfect the conditions and practice in the art of electric power transmission; to promote fruitful discussion of power transmission topics in conference, convention and the press; to secure accurate data on the subject; to serve as a medium for the interchange of experience and information among members in regard to this branch of the central station industry; and to seek the improvement and standardization of the apparatus and methods employed."

This is the first public activity of the Power Transmission Section.

There is an enormous volume of work which can be done by this organization which will prove a great factor in the industrial development of this country and which will be of immense benefit to the public at large. The progress already made in electric power transmission has been rapid and highly beneficial to the public. There is, however, still a vast amount to do in bringing what is already in practice to a higher state of development, to say nothing about the numerous opportunities which now only exist as plans or suggestions, or perhaps have not even reached this elementary stage.

According to the last census, there is 37,000,000 hp available in the United States in waterpower which can be developed at a cost which compares favorably with steam. Of this amount about 1,600,000 hp has already been electrically developed and approximately 1,900,000 hp has been developed for industrial purposes through means other than electrical, leaving approximately 33,500,000 hp still available for development and use for this and future generations.

In all probability these figures will prove far too low when a more careful investigation has been made. By this I mean that opportunities exist which have not been considered; as, for instance, in many watersheds huge reservoirs can be constructed, giving uniformity to the flow of the stream and enabling almost every foot of head from the point of storage to sea level to be utilized; and in other cases waterpower can be developed in connection with irrigation projects where neither alone could be developed at a cost which would be warranted.

To develop even the smaller amount of power named above would require to exceed $7,000,000,000.

It is interesting to note that the undeveloped waterpowers of this country exceed the total amount of power now generated by all known means. The bulk of these powers are, of course, located in mountainous regions, while the great bulk of all of our power now generated is in the populous sea coast and plains districts and often far away from these waterpowers. However, the question of electric transmission of power is purely one of economy and reliability. Given enough money for the equipment, we can transmit power from San Francisco to New York,

with no greater loss of energy than now obtains on many ten-mile transmission lines. Power is already being successfully transmitted to distances of more than 200 miles. The development of commercial transmission of power to greater and greater distances will depend primarily on the development of the art; and that is one of the things which this organization intends to stimulate to the greatest possible degree.

We are today using annually in excess of $200,000,000 of fuel that might be saved by the development of our waterpowers. In the movement of which we have heard so much of late of the conservation of our natural resources it must be evident to all that the resource which is most in danger of exhaustion, and which we should most strive to conserve, is our fuel supply. It is rather interesting to note that under the teachings of this so-called "conservation" movement the national, and to a large extent the state governments, have assumed an attitude which has almost completely discouraged the development of waterpower and is thus causing every day an unnecessary and flagrant waste of our fuel supply.

The development of our waterpowers represent an enormous source of available wealth to the community as a whole, but it does not promise the reward to the promoters and backers of these enterprises equivalent to that which is promised in almost every ordinary line of business.

After a careful study of fields of possible useful work it was the unanimous opinion of the officers of this section that the greatest abstacles to the development of waterpowers at the present time was the attitude of our national and state governments.

The policies of our governments have largely been dictated by men inexperienced in this line of work. Obstacles have been placed on the development of waterpowers which are burdensome to the degree of being prohibitive, and which are of no benefit to the government or to the public.

The government cannot give a title today to a waterpower site that would warrant the erection of a $600 miner's hut. Undertakings requiring millions of dollars are expected to accept such a title to the property which is to be improved and yet the title, it is claimed, can be revoked at will—and even on caprice of a governmental agent. The national government has apparently committed itself to a policy of limited tenure of grant,

which is contrary to the opinion of all of the advanced thinkers in the school of economics, and a policy which is self-evidently wrong in principle.

It is not the intent of these introductory remarks to enumerate the obstacles to the development of waterpowers that are now a part of the policy of the government, and such as are cited are taken up merely as examples. These obstacles are expected to be brought out and fully explained by the papers and discussions which are to follow.

The National Electric Light Association is the only national body representing the financial and commercial side of the electric light and power business, and it is as well a highly developed technical organization. When the policy of the government was framed this organization was not called upon, either directly or indirectly, for advice or assistance. On the other hand, the association has not attempted heretofore to influence the policy of the government.

Many of our individual members have attempted to secure a modification of the attitude of the government which would permit development work to be carried on under conditions which would be fair to all parties concerned, including the public, but without success.

The National Electric Light Association is not a political body, either directly or indirectly. It does from time to time analyze problems in finance, economics and engineering, and announces what it conceives to be the correct principles for the solution of these problems, and this work is then made public to all and can be used by any political body which sees fit to do so.

The association has not as yet solved, or attempted to solve, the problem of what the attitude of our government should be toward the development of our waterpowers, but is now actively engaged in the study of this problem.

Unfortunately for our waterpowers and the contribution they might have made in the past few years to the development and prosperity of the country, the issue has been made the excuse for a political controversy which, if ever carefully analyzed, will prove a disgraceful page in our political history. This controversy has been carried on for years instead of being settled in a judicial and business-like manner, and has seriously

interfered with the usefulness of several branches of the government, has caused unnecessary delay and expense to our national congress, has drawn the attention of the people of the country only to mystify them, and has almost completely prevented the natural development of our waterpowers which would otherwise have taken place.

The association recognizes that this matter has now become one of acute public interest. It has no wish to become involved in a dangerous political controversy, but in spite of the danger which this controversy presents, it does not feel it should longer sit by and watch an issue, which is of such vast importance to the development and welfare of the country and which it is unfortunately asserted has been used simply as a football of opposing political cliques, and used to elevate the reputations of certain individuals in the eyes of the public and destroy the reputation of certain other individuals.

In taking up this work it has seemed to the association that the public has acquired the right to participate in any movement attempted for the solution of this problem, in view of the long-continued controversy which exists and the attention which has been given this problem by the newspapers and the news-reading public. The association has therefore inaugurated its work in the nature of a public conference where all might be heard with proper regard for the opposing opinions of others. The audience will learn something even from biased and prejudiced opinions, and full discussions should leave little opportunity for serious difference of opinion.

It has been suggested that this controversy may be partially due to an unrecognized difference in the fundamental premises which have been unconsciously assumed without careful analysis, and by this I mean that one class, taught by the more recent and impractical school, assumes that the public lands are the absolute property of the government, intended only to enrich the treasury of the government without regard to other considerations, while the older and more practical school assumes that these lands are held in the nature of a trust and should be used for the settlement and development of the territory where they are situated, and thus contribute to the development of the entire country. The latter school is in accord with the precedents which actuated the government through many decades, and

while precedent alone should not govern in matters of this sort, there is a consideration which precedent in this case has injected and which is of prime national importance. I mean by this that a question of what constitutes fairness and justice has been injected into this problem that cannot be neglected. The government has from time to time dealt out vast areas of these public lands under the guidance and advice of the early statesmen of this country, who did so much to lay the foundation and produce the magnificent conditions which we now all enjoy, selling or giving away these lands for a mere fraction of what their ultimate value would prove to be, believing that the benefit of quick settlement would bring about by earlier use vastly more in the development and prosperity of the country than to permit these lands and opportunities to lie unproductive for many years, while the government haggled and bargained with the individual so that undue benefit would not flow to those who bought these lands and opportunities to productiveness.

This policy had the support of all the great statesmen of all parties from the country's birth until in the last few years, but it may be that the men we reverence who formulated and executed these policies lacked the wisdom of our later-day magazine-made hero statesmen, but in spite of this later-day wisdom, why does not fair play demand that the public lands and opportunities of Oregon, Washington and Colorado be utilized to develop these sections rather than to have the public lands of these and other states treated as public property, owned in fee simple by the federal government and used to enrich ratably those states that have already had distribution of their public lands according to the policies of the old school?

My views, in this particular at least, do not bind this body, the association, nor my immediate associates, but I still believe in the policies of our older statesmen and cannot believe that we would now have a prosperous nation of ninety million people if the policies of the new school had always prevailed. Further, I believe that every day that these new policies prevail we are retarded in our progress to greater prosperity. The unused lands might be producing crops each year in excess of their ultimate value when finally released, and every undeveloped waterpower represents a waste of fuel which brings us

that much nearer to fuel famine, while the potential energy of this water flows idly and wastefully to the sea.

There are many of those who believe that the public enjoy complete and perfect protection, as far as waterpower development for public sale and use is concerned, and that this whole mess of hysteria has been trumped up purely to provide a political issue, which, by misleading the public, could be used as a means of gaining public applause, and I confess that I cannot find anyone who can logically disprove this contention. It is a well-known fact that is no longer questioned in law, that every quasi-public corporation is subject to the regulation of its rates, either by the state legislature or by some other body to whom the legislature has delegated this power, which otherwise inherently vests in the legislature. If we keep in mind this fact it can be made plain that every objectable restriction and obstacle, placed by the government on the development of waterpowers, is unnecessary if not absurd.

The Power Transmission Section has many problems to solve which are strictly technical in character, or which for other reasons plainly lie within their own organization; but the problem which we are here to consider is one which does not lie within the organization, and therefore the public has been invited to attend. The Transmission Section has been compelled to take the initiative in the matter, and has arranged a certain program, but it is intended that everybody in attendance shall be on an equal footing and shall be free to express their views and take full part in this conference.

We have invited to this conference everyone who we could think of as being interested in this subject. There has been no attempt to confine the invitations to those who have views which coincide with the policies of the National Electric Light Association. The National Electric Light Association is not looking to sustain its policies if they are wrong, but is continually searching for the truth. It is a scientific body as well as a commercial body, and the ultimate development of all scientific effort is that of finding complete truth.

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The Chairman: We will not stop now to take a formal vote of thanks to Secretary Fisher for his remarks. I think we shall find much greater encouragement in his words than he

dreams of. There has been a feeling on the part of some of us that the men who are experienced in this line of work have been given very little opportunity even to express their views; but it seems we should drop that idea in now approaching the consideration of the subject. I for one want to apologize for this and other criticisms I have made—if there is the disposition on the part of the government to listen and give an opportunity to the men experienced in this business to be heard. We object only to having these policies framed up without regard to the men who are trained in this line of work.

Secretary Fisher really correctly stated it when he said it is a lack of the existence of a policy that we suffer from. Under such a policy—or lack of it—lands could be withdrawn and opportunity could be withdrawn; and today the biggest part of our opportunities is withdrawn; and it is a question whether the government can give good title now to these lands and powers. That point will be taken up in other papers and addresses.

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In view of the vein in which Mr. Townley's address is written, I am going to say something, especially to Mr. Secretary Fisher, in behalf of this conference. Mr. Townley is a serious-minded business man who generally writes without any touch of sarcasm and without any touch of joking in what he has to say.

The men engaged in the waterpower business have been harassed, annoyed and irritated for years and years, not so much by the direct action of the government, as by things that have sprung out from the government bureaus and the government employes. We have heard about a huge waterpower trust. A great many of the men in this room are accused of being part of the waterpower trust. I am one of them. I get clippings from all over the country—"Teddy after you with a big club," and things of that sort. The most absurd methods were used to make it apparent that there was a big waterpower trust. If someone happened to be on the board of directors of some one company and also on the board of directors of another company, many people thought they could trace through this membership on these two boards of directors a huge combination to control the waterpowers of the country.

In my paper I state that it would require something like $7,000,000,000 to develop the undeveloped waterpowers of this country. That is probably a very low estimate, so you can see what a mammoth affair this waterpower trust would have to be. For a long time we had statements by public speakers telling about the marvelous opportunities for great profits that these waterpowers possessed; and in sensational articles in our sensational magazines it was stated how these waterpowers were being grabbed by a combination of individuals. It has become difficult for myself and a man like Mr. Townley to talk judiciously about this subject. Therefore, there is apt to creep into our statements a bit of ridicule, or sarcasm, or a bit of a joke.

I want to plead further that that is not confined simply to the men engaged in this business. I happen to have in my pocket—I had no intention to read it here—a few notes made in a meeting I attended the other evening, at which the conservation movement was discussed. The meeting was called by men engaged in charitable work, and they asked some magazine writers and newspaper writers to confer with them as to how to interest people in the charitable work. I came into the conference accidentally. I pleaded a previous engagement for today, Saturday, and said that I had to be at a meeting which was to consider this question of conservation—and that started a discussion on conservation.

Every man in the room was a writer, and most of the men had written with a great deal of interest about the conservation movement. They agreed that, carried on rationally and sensibly, it was a great thing, but that it had been woefully overdone. They were all inclined to joke about it, and finally said that somebody had offered a prize for the best definition of what conservation meant. I noted and copied a lot of what they said, and believing that to interject a joke once in a while in a meeting of this sort may relieve the monotony, I will read off some of the definitions given by these people—all friends of conservation, all believers in conservation, but who think that the movement had been carried by some of its admirers to a point which was not justified. Some of the definitions are:

"Bigotry Personal Publicity of Theatrical Character." "Fiction in the Guise of Truth." "Saving for Posterity and Waste for the Present Generation." "A School for Scandal." "Talk."

"Slander." "Hitting the Pipe." "Hysteria." "A guise for the New Nationalism." "Tommyrot." I won't read off any more of these definitions, but that gives the tenor of them.

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We had been urged to offer for the passage of this conference three sets of resolutions. I have not the resolutions with me, and will not attempt to give you more than an idea of what they contain—one was to the effect that we are drifting away from the policy which has represented the Government's attitude on the question of public lands for many decades, in fact, from the time of the formation of this government. Until within the last few years it has always been assumed that the public lands were held as a trust for the development of the particular part of the country in which they were situated, and in that way the development of the entire country; but during the past few years there has been a tendency to hold that these lands belong to the government. One resolution, however, calling attention to the fact, protested against the use of the lands in this way, and demanded that the lands be thrown open to settlement; also called attention to the fact that an area of land twenty-six times as large as the state of Massachusetts had been withdrawn from entry and perhaps now could not be offered for entry, so that good titles could be given.

Another resolution was to the effect that a commission should be appointed by Congress to investigate thoroughly this whole problem and make specific recommendations to Congress for the passage of laws that would take care of the situation to which Secretary Fisher called our attention.

The other set of resolutions took the position that as the State Legislature now, in every state, can inherently regulate all quasi-public corporations, that the restriction and obstacles that are now offered by the government to the development of our waterpowers are unnecessary; that there is nothing to fear—that if they would throw them open for occupancy, the method now in vogue for the control of all quasi-public corporations would take care of the situation entirely.

At the last moment we got a telegram from Secretary Fisher saying that he would be here at our conference. He arrived just a few moments before the conference opened. We had already received advice that the government today was not in the atti-

tude of disregarding what our wishes or views might be on a matter of this sort, and was willing to advise with us; and we thought it best not to attempt to offer these resolutions until we had a conference with Secretary Fisher. It is hoped that we shall be able to arrange for such a conference between this session this afternoon and the one to be held this evening.

* * * * * * *

I have heard Mr. Mershon's discussion, and I have discussed with him before one particular point in connection with franchises. I am sorry to see a man of Mr. Mershon's ability hold out against what I believe is the advanced thought of all economists on the subject of franchises. I am sorry to hear him make a statement that he believes that the tendency is against perpetual franchises, and is in favor of the limited franchise. I do not see how anybody can contend for a limited franchise. I do not see how quoting one error can make it right to perpetuate that error. It is economically wrong to create an artificial depreciation factor. When you grant a franchise for a limited term of years, it means you are creating an artificial depreciation factor that the consumer is bound to pay for. I figured out not long ago the case of a gas company where, if it really meant that their franchise expired at the time the principal grant terminated, they would have to charge their consumers $1.79 a thousand for gas, rather than 95 cents a thousand.

Now, if we are to have limited franchises, it means that the courts must allow us to add an artificial depreciation charge, which will reduce our property to its salvage value at the time of the expiration of the grant.

When most of the franchises now in existence, limited franchises, were granted, they were granted and accepted on the theory that the time named specified simply the terms under which business could be done, and did not mean at the end of that time that the right to do business ceased. We have awakened to the fact, now, with the growing antagonism against corporations that many people hold, that the expiration of a grant means the expiration of the right to do business. We have also learned, and perhaps we overlooked it before, that every quasi-public corporation is at all times subject to the regulation of its rates and service by the state legislature, unless the state legislature has already delegated that power to some other body.

Now, one of the great foes today to the development of the freest work on the part of quasi-public corporations is the limited franchise.

We have seen developed in the last few years the commission form of regulation of the quasi-public corporations. I believe that without exception every law providing for these commissions has also provided what is, in effect, a perpetual franchise, in spite of the fact that those states that now have commissions depended formerly on limited franchises. Mr. Maltbie, one of the Commissioners of the First District Commission in the state of New York, has written extensively on the advisability of the perpetual franchise. There is a great deal of literature on this subject. The thing was taken up and carefully considered by the public policy committee of the National Electric Light Association, and the conclusions of this committee appeared in a report which was virtually a challenge to everybody who believed the other way, and the challenge has not yet been accepted, unless Mr. Mershon accepts it now.

Unless I am misinformed, there is no authority on this subject—any person who is believed to be an authority on this subject, generally accepted as such—that believes in anything but a perpetual franchise. These properties cannot go to pieces like the deacon's one-hoss shay, and if they must be forfeited at the end of a certain period of time, good property must be charged off at its salvage value—good property which they could continue to operate. In fact, there is no such thing as a definite life to this property. One part of the expenditure goes, perhaps to widening the river, to widening a tail race, and it does not amount to anything unless the power is used. A great deal of the outlay is for organization expenses; some of it goes into masonry dams, which I construe as perpetual, and a very large part of the outlay often goes into wooden piles which, in some sections of the country, will not last more than six years. We are compelled to renew this property continually.

I am one of those who oppose the idea of a limited franchise, no matter how long the franchise may be issued for. People justify the error by saying that it does not amount to much—it is for a period of fifty or a hundred years. The truth is that nearly all our public service propositions are a continuous construction proposition; each year we must keep building for an increased

population. Practically every part of the country is growing, and we must keep on continuously putting in more money.

I might cite as one instance a quasi-public corporation that was organized about twenty-three years ago. Each year for the last five years they have spent three times as much money as the whole original plant cost. Now, when you begin to approach the time when these franchises expire, the company can find no way of financing itself. The result is the company cannot give service—complete service from a geographical standpoint. The public is not interested primarily in a low rate, but in getting com-

> We are a nation of profligates in the expenditure of both our collective and individual resources, and we have many lessons to learn whereby we may check our extravagances. If we are to devote the bulk of our literature and much of our thought to the corporation and the trust, while other matters cause the ills from which we suffer, then we cannot understand or successfully meet the problems which face us. No doubt in the days of witchcraft many ills which might have been easily understood and easily cured were allowed to run on in the belief that the sources of these ills were the witches, so the energy of that period was probably consumed in locating and exterminating witches.
>
> —HENRY L. DOHERTY.

plete service from a geographical standpoint; next, it is interested in getting good service, and thirdly in low rates; and the first two are of vastly greater importance than the last. Today there are hundreds of quasi-public corporations that are hampered badly by these conditions. They are injured and the public is injured, but the public is far more greatly injured than the company.

I cannot see any argument at all against a perpetual franchise, but can see every argument for the perpetual franchise, and I cannot see any reason why there should be this necessity

to limit franchises, or restrict them in any way, when complete power of regulation is already inherently existent in the legislature or some other body. Let us assume that I could turn over a ground lease, in perpetuity, to anyone of the rest of us in this room, and I would have the power to say what rental you shall have for the building from time to time, and the only appeal from that decision of what you should have for the ground rental of that building would be the courts, which would only act if it meant confiscation. Now, that is the exact situation with so-called quasi-public corporations in this country.

> One of the first principles of the law is "ignorance of the law excuses no one."
>
> If you knew the laws yesterday you don't know them today.
>
> The only man that is safe from the rule that "ignorance" excuses no man is the man who devotes all his time to keeping track of what the law is.
>
> If the mania for passing laws doesn't cease the ordinary man won't have any chance at all based on his own merits.
>
> It will be a question of who can employ the ablest lawyer.
>
> We look on lawyers as a necessary evil.
>
> —HENRY L. DOHERTY.

I want to apologize to the audience here. I felt I could not allow that one thing to go unchallenged, for in my opinion today the limited franchise idea is holding back the development of the electric light and gas business and the street railway business enormously, and to the great detriment of the public.

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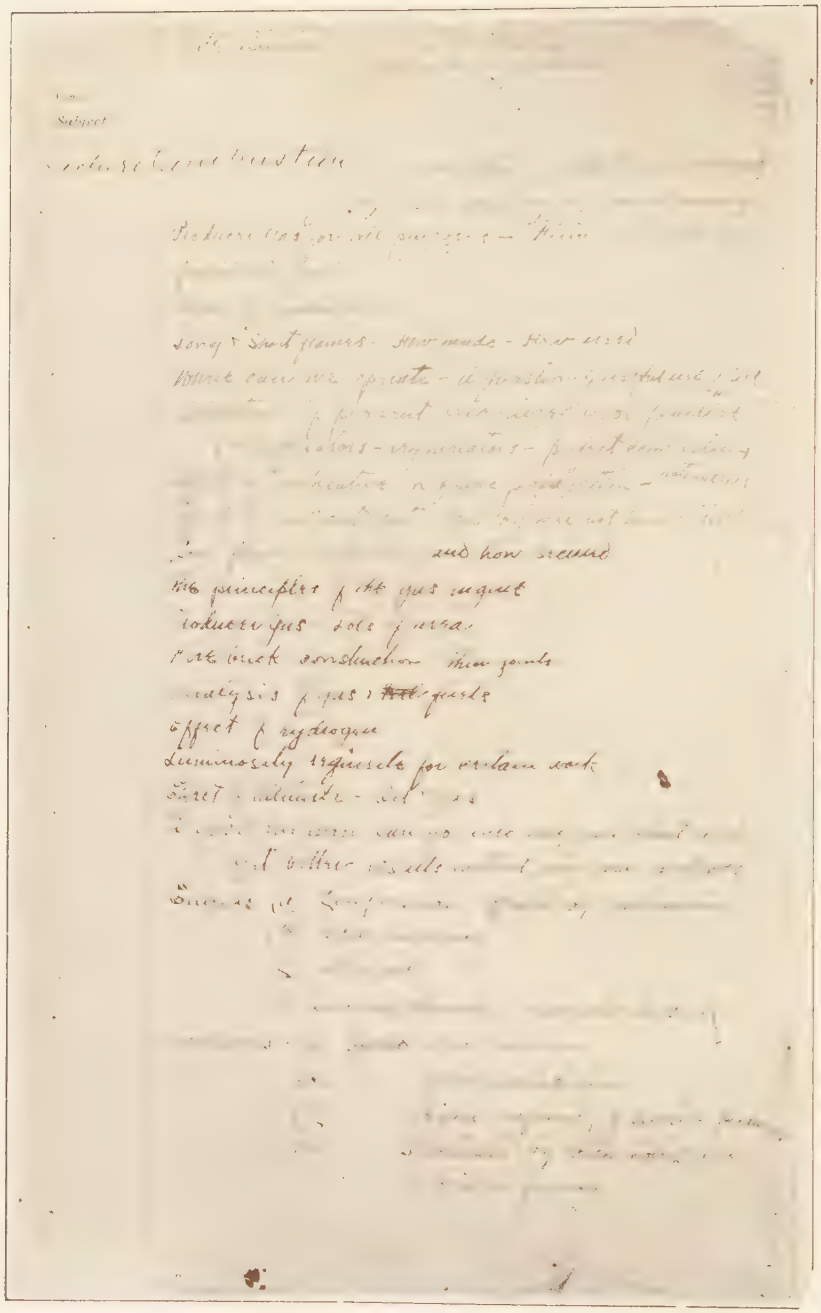
We had a number of specific topics to be discussed, all of them simply details of the one general policy. I think I am free to state that the secretary, in further conference with us, realizes that there is much to be done in studying this problem,

both on the part of the people and the government, and he very justly makes the statement that the power people are not a unit as to what they want, as we have learned from the discussion tonight. If we carried the discussion further we would probably find there is a greater difference of opinion in our ranks than has become manifest by the discussion tonight. We are not a unit as to what we want, nor does the government know what is best, and perhaps both together do not know what is best for all of us.

Mr. Thomas, in his remarks, seemed to think that there is controversy between the power promoter and the public. I do not think that is so, in the sense of this meeting. This meeting is called in the spirit of what is best for us as a whole. There is no difference of opinion as to what is good for the company or the public, except the one point—the division of profits. Up to that point their interests are identical. We do know, as a people, that we are losing not less than $200,000,000 a year from the fact that we have not developed our waterpowers to take the place of coal consumption to the extent that is now possible. Now, $200,000,000 a year is a great big expense, compared with the small facts we are talking about.

We also maintain, I think we can demonstrate, that many of the restrictions that have been placed on the development of waterpowers are of no value to the public, no value to the government, but are an obstacle to the development of these powers, and bring about a failure to be able to put these waterpowers on such a basis that they will attract the necessary talent and capital for their development. This is costing us today not less than $200,000,000 a year.

> Emotion of any sort lessens the accuracy of our judgment and makes us foolish in a greater or lesser degree.
>
> —HENRY L. DOHERTY.



ONE OF MR. DOHERTY'S "YELLOW SHEETS"

1912

Not only was the firm of Henry L. Doherty & Company growing and prospering in 1912 but it was a year of marked advancement for the entire electrical industry. Mr. Doherty was elected first president of the newly-organized Society for Electrical Development, a movement which had been under consideration by the electrical interests of the country for many years, but which required the skillful hand of Mr. Doherty to bring into actual operation. The society was organized to promote the use of electricity in every form, its chief function being to familiarize the general public with the variety of uses to which electricity could be put, especially in the home.

As chairman of the Power Transmission Section of the National Electric Light Association, Mr. Doherty assumed leadership of the movement to free waterpowers from the oppressive restrictions which were preventing development for the benefit of the public.

In February, 1912, a meeting of the managers of the Doherty companies was held in New York. One of the chief topics discussed at the meeting was welfare work. Mr. Doherty also took up other subjects. He said:

WILL attempt to show you in a few minutes how, if service annuities were recognized as correct principles—as something that we ought to do for our men—it would be bound to result in pensions to be granted to the workingmen by the state, a form of paternalism that it seems to me is a threat to the stability of our government; but I also object to pensions on the ground that they discourage thrift. Anything done along this line should be done on a true economic basis. Whenever we depart from natural laws we are apt to introduce complications, and later on we find ourselves doctoring symptoms.

I do not believe in profit sharing, and for good reasons. As far as I know every attempt to get beneficial results by profit sharing has been a failure. I myself worked for a company in 1884 that had adopted the plan of profit sharing, and while it seemed to be a success at first, it proved afterwards to be a dismal failure.

I do not believe in company life insurance, and do not feel that we should provide life insurance, any more than a life insurance company should provide an isolated electric lighting plant for its own building. I do not believe in taking up what is the legitimate business of one group of men, and making it a matter of philanthropy with another group.

We have industrial troubles all over the country. We have a growing demand for socialism. We have on every side a pronounced antagonism to corporations, a pronounced antagonism to wealth in any form; and we are going on doctoring symptoms, rather than trying to cure the underlying conditions.

The people believe generally that something is wrong, and I would like to see men strong enough to mould public opinion, I would like to see those men get together and say, "The public believes something is wrong. If their belief is true, we are going to correct the things that are wrong. If they are given the impression that a lot of wrongs exist that do not exist, they are going to be explained; but any real wrongs are going to be corrected, and the imaginary wrongs are going to be explained away." If we could do that it would do a great deal to strengthen the present business situation in this country, which, fortunately in our own line of work, gas and electricity, is good, but in other lines of work is very bad; due mostly to this general feeling of unrest, these tendencies to legislate and curb every effort for development.

The people that we must naturally work with, if any comprehensive movement is to be started to correct present conditions, the people we must all start with are our own employes. They are the only ones we can reach and teach.

I am one of those who believes there are a great many real wrongs, and that there are a great many more imaginary wrongs. The entire public, both the working class, and the men at the head of large corporate undertakings, do not realize the situation as it exists today in this country; that is, they are all laboring

under a great misapprehension. Some of these matters can be reduced to an arithmetical statement that does not leave any opportunity even for argument. You hear a great many people say that the accumulation of wealth in the hands of a few people in this country is a threat to the stability of this country; and in that I agree with the general opinion; but while everybody else seems to blame the man who has accumulated wealth, I am rather inclined to blame the man who has not accumulated wealth. I admit that my present attitude is somewhat influenced by my two European trips. Last summer I spent a good part of my vacation in northern Norway, and in Sweden, and when an American studies the way many of the European farmers and working people have to live, he comes back to this country thoroughly out of patience with our American workingmen; and yet it is rather interesting to know that the French farmer, for instance, on a very small plot of ground, will live perhaps better than our average American farmer, simply because he knows how.

Up in northern Norway you will see many farms where you cannot understand how they grow enough to support their own families, and their own cattle, to say nothing of having an excess to provide clothing and the necessities of life; yet somehow or other they manage to live.

You hear a great many of these modern high-brows trying to tell us the minimum amount on which people get along, for instance, in New York City. Well, they remind me of a young fellow who used to work for me once, and he was pretty handy with figures, a young boy, who had been through a sort of technical high school. I wanted to increase the pressure on the entire works, and it occurred to me that the only weak point would probably be the purifying box covers, as they covered such an enormous area, so I asked him to determine the thickness of the metal and figure out whether those boxes would stand an increased pressure of, we will say, one inch. After he had figured the whole thing over, he replied to me by saying that those purifying box covers had blown up years ago, and we had never found it out; in other words, the way he figured it, they were not strong enough to stand their present pressure.

According to these high-brows who tell us the minimum cost of living in these United States is a certain amount, according

to them thousands of people have died every day of starvation, and yet they are still walking around to save funeral expenses.

We all know, I believe, that in almost every instance the trouble with our American man is that he has been preached to from the wrong view point. He likes to listen to the man who tells him how badly he is abused, and how little he is paid, and how hard he has to work, and things of that sort. If you were to treat a child in the same way that the ordinary workingman has been treated by the modern demagogue, you would have a thoroughly spoiled child. We are all more or less children, especially as we descend in the scale of intelligence. The greatest trouble today with our American workingman is that he does not know how to spend his money—how can we teach a man to get the greatest value for every dollar that he spends?

I have given a great deal of thought to that. I have seriously thought of putting domestic science teachers, as far as possible, into the homes of our workingmen; and I think perhaps the time will come when we will do that, if we can do it without offending the workingman.

Just a short time ago I was talking to some friends at the Chemists' Club, and one of those fellows, who is quite a clever chemist, was telling me about his attempts to make artificial butter. He is making artificial butter out of almost everything, cotton seed oil, fish oil, and cocoanut oil, and all sorts of things, and he has three men who are playing the victims and eating his butter to try it out.

So the other night, when we were sitting at the Chemists' Club, and his motor car came for him, he invited me over to the boarding house where these men were. He said, "We will see where they live, how they look, and what they are doing;" and said he would show me some of this butter.

I went over to this boarding house, and it interested me more from a general standpoint than it did from the butter standpoint. Three men were there who were just finishing their supper, about half-past eight or nine o'clock at night. They worked for a street railway company. We got in just as they were finishing their supper. They were eating in a middle basement room that had no natural light, and things were served on the most uninviting dishes I had ever seen; they were all nicked. The tablecloth was dirty, and uninviting in appearance, and yet the remnants of

the food were left there. They had a big piece of steak and some peas, and the food apparently was of the very highest type, of the most costly kind, yet the whole thing was somewhat disgusting in appearance.

I managed to get somewhat over the house. I found in one room three men were sleeping. It was about the meanest room I had ever seen, and I could not help comparing that with my own home, when I was a boy, and after my father died. We had less to live on than the average workingman's family, a great deal less, and yet I never remember the time when we did not have a pleasant home and a nice table.

It was simply the difference between knowing how and not knowing how.

Almost all our human troubles come down to a matter of incompetency, and nothing else. I believe that the greatest work that we can do to help the modern workingman is to try to teach him how to spend his own money. The most direct way to do that, as I see it, is to increase his idea of the value of property, that is, make him see the value of his money, so that he will use it more carefully.

I have studied this for a long time; in fact, when we established this firm, I wanted the way to come when we would do business primarily with the wage earners of the country. Every mortgage we have taken in the past seven years has in it a clause which will eventually enable us to resell that mortgage in ten dollar units, or one hundred dollar units, or five hundred dollar units.

The idea I am about to spring on you now is not particularly new with me. It is very old. It is an idea that has perhaps had its birth when I was working alongside of these men, and my contact, my personal contact with the wage earners of America, has perhaps been as intimate at times as anybody's. I have worked with them, and I have paid them off, and they have worked for me in various capacities.

My theory is to make a capitalist out of the wage earner. The question is: Can that be done? I have talked of doing this with a great number of men, almost always they have simply assumed that it could not be done. I believe that it can be done, and to a limited extent I have demonstrated the fact that it can be done.

I want to get the help and assistance of the men in this room to demonstrate that so fully that I can call together the important employers of labor and get them to attempt what we are going to attempt. I aim to make such a success in what we are going to attempt to do that others will endeavor to do the same thing.

I have said that in a measure I have demonstrated this. The National Electric Lamp Association promised its men a profit-sharing fund. Before it was time to divide this fund they concluded they had made a mistake—they should have provided for the investment of the money on behalf of the men, rather than for paying it out directly to them; because they believed, if the money was paid out directly to the men they would simply spend it—they would regard it simply as an increase in salary which would do them no permanent good, and might do them harm by increasing their mode of living and making it harder to go back and live in a modest way. So they came to me, knowing I was interested in this problem. They asked me if I would not talk to their men and try to have their men vote to have that profit-sharing fund invested for them, rather than paid out to them.

I went up and talked to these men—I talked to them all day—and at the end of my talk they voted unanimously to have the fund invested for them for a period of five years.

Mr. Terry and Mr. Tremaine, the president and vice-president of this organization, were so pleased with the result that had been accomplished that they then wanted to organize an investment company, permitting their men to pledge a certain amount of money from their salaries, so I went out to the winter meeting of their men at Cleveland, and talked to a group of about eighty of them, with the result that we formed two companies, one an investment company, and the other a company for a more speculative character of stuff, to which we got about five hundred subscribers, totaling about three hundred and sixty-five thousand dollars.

These men are paying in their subscriptions from month to month, and we have invested that money for them.

The whole thing hinges on whether you can get workingmen to do that or not; the question is, What arguments have we got to get them to do it?

I presented those arguments to the National Electric Lamp Association and to their men, and the result was that we got

these subscribers; which proves in a way that it can be done, although these men were what might be termed the higher class of wage earners, yet among the subscribers are some of the poorest paid, and young men just starting into the business.

I tried to show them what the investment of money meant, if it could be made to earn reasonable rates of return. I took in every case what I termed natural periods of time, one period being the proverbial lifetime of a man, three score years and ten. The other I took as forty years, being the working life of a man, assuming that he goes to work when he is twenty, and is incapacitated for work when he is sixty, and the other being the period from birth until a man reaches the age of twenty-one; and here are some figures that I will show you on that.

Before I show you these figures, I would like to say this, that directly or indirectly, I have been connected with financial work for fifteen years, and I have fifteen years of actual experience from which to draw. I have found that the investment of money could have been made during my experience, could have always been made, so that it would return at least seven and one-half per cent. There is a general belief in the minds of the investing public that if money is invested so that it returns more than four, four and a half, or five per cent, that they must accept risky investments.

One of my friends, Mr. E. W. Rollins, who for years was at the head of E. H. Rollins & Sons, bankers and bond dealers of Boston, immediately disputed my statement that it was safe to figure on a seven, or a seven and a half per cent return; and then before we had finished our argument, he told me he had had a certain amount of money that belonged to his minor son, and that for a certain period of time this money had grown from a value of $17,000 to $40,000. I do not remember the time that he said, but I had in front of me when I was discussing this a compound interest table; and after consulting this compound interest table, I found that he had earned during that period twelve per cent per annum; and yet his investments had been confined entirely to bonds, and particularly to five per cent bonds; and in spite of the fact that he was investing in five per cent bonds, his gross earnings were twelve per cent a year. That was due to the fact that when an issue of bonds came out that looked favorable to him, he would buy a certain number of those bonds.

When the next bond issue came out that looked favorable to him, he would sell the old bonds he had previously bought, and with the money he would buy bonds of the new bond issue.

As all securities tend to advance as they become, as we term it down here, "seasoned," he would buy these new bonds, and by changing his investments, he had managed to earn twelve per cent on bonds, the majority of which were five per cent bonds.

We, here, do not believe it is necessary to accept as low a rate of interest as five per cent, but we believe that money can be safely invested in the preferred stock of different companies, be amply safe, and if you can yield twelve per cent on a bond, you ought to be able to yield more than twelve per cent on stocks; but all the figures that I am going to show you here are going to be figures which I believe to be ultra conservative.

Here is a compound interest table worked out for a period of seventy years, that is, a man's lifetime, and it is rather interesting to know that $1 compounded at these various rates, 2, 4, 5, 6, 7 and 7½ per cent, will become at the end of seventy years

at 2 per cent	$ 4.01
at 4 per cent	16.26
at 5 per cent	32.40
at 6 per cent	64.64
at 7 per cent	128.72
at 7½ per cent	181.52

In other words, $1 invested at 7½ per cent over a period of seventy years becomes $181.52.

Before I get through I am going to show you, as speedily as I can, the secret of how nine-tenths of the fortunes of this country have been built up, and I wish somebody had showed it to me when I was quite a young fellow, and not left it to me to figure out—I would have got an early start.

That table is very impressive. All of us, workingman, manager, or whoever we are, as a rule lose sight of the effectiveness of compounded interest. Time and time again—and a large portion of the success of the operations of these works has been due to the fact that we have not lost sight of the wearing down which is produced by fixed charges—time and time again I have been able to save what looked like a good investment, and which in reality was a foolish investment, just by my intuition for figures regarding compound interest.

Three years ago, or four years ago, the boys of Denver insisted that they ought to have a new holder, and they wanted a three million foot holder. Our own engineering department here in the office concurred with them, and in the face of adverse opinion I did not like to take issue with them, although I did not approve of the idea; but I held the thing up until I could get out to Denver. Then I sat down with the boys out there, and after figuring the thing out myself, I showed them how by putting in small holders, and using district holders, I could figure up a holder capacity of three million cubic feet, and have as much money in the bank as their three million foot holder would cost at the start; in other words, by putting it in small amounts, and saving the increased charges, that it would amount to a sum equal to the cost of the three million foot holder, and we would still have as much holder capacity as if we had the big one.

If you want to make a man save money, you have got to impress him with what he can make that money do. When I was talking to the National Electric Lamp Association boys, and was trying to impress them with the importance of saving money, and how it could be made to breed, one of these fellows said, "Gee!" I made the statement that when a young man of thirty spent a dollar, he was spending what ought to be $14 when he was seventy years old, and Harry Rice, who wanted to bring a laugh, if he could, says, "Gee, I took my wife to the theatre last night and spent $4. I spent what would have been over $50 when I am seventy years old." I looked at my table and said, "Well, I have made a mistake, my friends, that should have been $20, instead of $14."

I had this table before me, and I said, "Instead of spending $50, you spent what would have been $80"; and then he got to figuring the thing out, and he says, "I took her to supper, and then we had a taxicab, and one thing and another"—finally figuring out that he had spent $15. I said, "You spent what would have been $300 when you are seventy years old." The little attempt to bring a laugh happened to bring a splendid example.

When a young man of twenty spends a dollar he is spending what might be $40 when he is sixty years old.

It is almost proverbial amongst students of problems like this, that the great mass of people fail or are in want during the last period of their lives, and that their are few men who will

deny themselves temporary gratification to insure themselves against future want; and yet the time comes when that is a perfect nightmare to them, what is going to become of them when they are growing too old to work; and that has got to be impressed on them during the period when they are able to earn money in excess of their needs. When a man is earning money over and above his needs he has a margin of safety; but when a man allows himself to spend everything that he earns, he has nothing to fall back upon if the time ever comes when he has to earn less.

The word "poverty" is a relative term. I think I know lots of men whose incomes are twenty-five or thirty thousand dollars a year, who are miserably poor. They suffer from it as much as any workingman would who lives beyond his income.

When a man spends more than his income, when he is always a little bit behind the band wagon, that man is poor; when a man saves a little bit over and above what he earns, that man is relatively rich. The term "poverty and riches" is purely a relative one; and while we live in an age when we sneer at saving money—when most people who are saving are termed miserly—yet there is nothing that will contribute so much to human happiness as the feeling that one is independent. That feeling is something that gives a satisfaction that nothing else can.

We are living, as I will show you, as a nation, in a very extravagant way, every class of us. I also feel that many of these expenditures are due, not to the mere wish to spend money, or to the pleasure that spending money brings, but due to the fact that the people have not got the moral courage to live on a more modest plan than their friends and associates.

The Indians used to get together, and, as a matter of rivalry, they would see which one could stand the most torture. They did not enjoy that torture, but that was just that old sensation of rivalry which now pertains to the American people in the spending of money. They do not spend it necessarily for the pleasure of it, but just because they don't want to have the finger of shame pointed at them, any more than the American Indian would who would renege at having a dart stuck in his back.

It may be difficult for a man to develop the moral courage that will enable him to live on a moderate plan and save money, if he is going to do it by himself; but if you appeal to a crowd of men, it does not require the same degree of moral support; the

efforts of one justify the efforts of the others; and you can more easily induce men to be saving and careful when you treat them in groups, and go to them in groups, than you can when you try to appeal to them individually.

It has always been the custom, if an employe came to us and asked us to invest money for him, to tell him to go and buy government bonds, or something else of the same general character; in other words, the employer has never been willing to take the responsibility of recommending any investment except some investment that was so eminently safe that there could not possibly be a loss from it.

We would believe that we were doing the right thing when we told that man to go and invest his money in something that we would no more think of investing in than we would think of jumping out of the window. We could not make a living at it. We could not support ourselves; and yet that is the character of investments we recommend to people who ask our advice, and we do not afford them any opportunity of doing otherwise.

I confess that I did not realize what a great difference there was between a savings bank deposit and the investment of money at the usual rates of interest until I commenced to make up these tables.

One of my friends down here is a man who has been in the banking business for sixty-odd years, and I heard him tell some men that when he tried to get above four per cent on his money he was in great danger. I had a little discussion with him about that, and incidentally asked him how much they earned on their capital, and I got rather an evasive reply, but in a lecture that he delivered a few months afterwards—and of that lecture I have a newspaper copy—he made a statement that it was an easy thing down here to make thirty per cent on your money per year. The return on the particular investment that you seek, and the return that you realize from an investment of value, are two very different things.

I can show you that there is not one of these houses down here, housed in these numerous buildings, that we can see from these windows, that could live on a return of, say, less than twenty per cent per year on their capital; and to assume that the individual has got to take two or four per cent, when these people can get thirty, is absurd.

In the first place, we have got our universities to teach engineering, and teach everything else, but there is no place that I know of where you can learn the science of money getting; and up to date the money getter has been primarily the man who has started out with the intention of getting it.

I have mixed with all sorts of people. I have been an accountant; I have been an engineer; and I have been a little bit of this, and a little bit of that; and I do not believe as a rule that any class of people that I have ever mixed with have ever had a lower class of intelligence than the financial class in this country. In spite of the fact that I believe that they have the lowest general intelligence, yet they have apparently been able to reach success in life, as the general public in America measures success, within a greater degree than any other class, even these high class engineers, and many other men, with whom, certainly, these men cannot rank.

Now this is due to the fact that the science of money getting cannot be learned from books, and most men do not get a chance to learn it at all, because they are not in the atmosphere of it.

I want to take that atmosphere home to the fellow who is not in the atmosphere of it.

This chart shows you, if you were to invest in a 2 per cent government bond—and the government, by the way, got out a special Panama bond, which they offer to the public, which pays 2 per cent interest, payable semi-annually, and they issue those bonds in denominations as low as $20—at the end of seventy years $1 becomes $4, so there certainly is not much incentive there for a man to save. He says, "Let us spend it." He is a little in the attitude of the fellow who carried bricks up the seventh story all week and got $7 Saturday night, and who put it on the turn of a card and lost the whole thing in one play, and who walked out saying, "Easy come, easy go."

That is the spirit that pervades a large portion of the working class.

Telling that story reminds me of another one, and that is that the average employer is anxious that his men shall get rid of their money just as fast as they can; and to illustrate the trend that this desire takes, I might tell my experience with two of my friends. One of them had the contract for hauling the coal and coke for the Cincinnati Gas & Electric Company, and during

1906, when we were all having so much trouble with labor, this man was failing to deliver our coke, failing to haul our coal, and we were having a great deal of trouble on account of his inability to handle the work for us properly --he, in turn, kept explaining to us that it was so difficult for him to get men and keep them at work.

We had him up before the board of directors two or three times, and finally when I saw him I found that things were going a little bit better, and complimented him upon it, and he said, "Yes, I have hit upon a great thing. I have a great scheme now. I pay my men off every night, and I always make it a point to pay them, if possible, in a saloon, each man in a particular saloon, and then he spends that money right away and treats his friends, and the next morning he turns up ready to go to work; whereas, if I give him a whole week's wages at one time, they treat among themselves and get themselves in such condition that I do not see them for two or three days."

I thought that was about the most dreadful thing that I had ever heard of. I pondered over it. Shortly after that I was coming back from Denver on the train and met one of my friends who had been prominent in the development of the mining business in Colorado. I told him that story. He said, "That is awful; that is awful. That man ought to be lynched." Then he went on and delivered a long tirade against drink and what a terrible thing it was. He preached one of the most eloquent sermons I had ever heard, calling attention to the number of deaths that had been caused by drink, how a man could not come to work after a spree and be thoroughly competent, and how it would cause the death of the worker or groups of workers who had families to support. He finally wound up by saying, "That is not the way to do it. I always made it a point to try to open up a gambling room in my neighborhood; then I paid the men off in the gambling hall, and the next morning they are perfectly competent to come back to work; it does not hurt their health any." He went on to praise the efficacy of a gambling hall as a means to rid men of their money which kept them steadily at work and did not injure their health. He was convinced that the gambling hall was the thing.

I want to do the same thing, but I want to have the men use their money in a way that will be beneficial to them in their old age, and also use their money in a way that will tend to correct

many of the industrial and political conditions under which this country is now suffering.

We particularly suffer from it, and probably always will suffer from it more than other corporations, because when the public commences to have a feeling of antagonism toward the corporations it naturally creeps out and is apt to be directed against the corporations with whom the public deal the most, the quasi-public corporations. When the quasi-public corporations as a group come to a point of taking up this or some similar plan of welfare work, they can explain away many of the fallacies now existing and create a condition where there would not be the division between labor and capital that there is now.

I started this lecture by saying that most people blamed the men who had accumulated money, while I blamed the men who had not accumulated money, but I believe it is possible at some future time to call together the men who can mould public opinion and the big employers of labor in this country and make it plain to them that they must do something to change the present conditions.

We are a country ruled by majorities. It is true that a large portion of the wealth that has been accumulated in this country has been accumulated by the few. If these wealthy men think for one moment that they are going to live in peace and harmony, free to attend to their great affairs, and are not going to be regulated and curbed, and that all sorts of things are not going to be done to them, when the great majority vote and have the voting power, they are not as sagacious as I think they are. A country ruled by a majority will always object to a class that they believe to be a privileged class, and the only way to find proper support and protection for money and property is to increase the number of people who are the possessors of accumulated wealth.

Getting back to the matter of saving, we find that the man who buys government bonds paying 2 per cent would only accumulate $1 in seventy years; the man who uses a savings bank at 4 per cent does a little better, he accumulates $16.26; whereas, if a man could invest that so he could get 7½ per cent a year he will have $181.52 at the end of seventy years.

There is no doubt but that the majority of investors in this country have sacrificed an unnecessary amount for the sake of

safety and salability. Many people will say, "I cannot find a stock having a ready market that pays more than 4 or 5 per cent that it is safe to invest it," and they will accept a 1 or 2 per cent reduction in their income rather than have a stock that cannot readily be sold. Another man says, "I won't buy anything but a municipal bond, because I must have a safe investment"

We believe that safety can be secured in two ways and yet a high rate of return earned; first, by discrimination, and if you are not in a position to exercise discrimination, then by diversity; and on the basis of diversity here is a table showing the amount of money that can be lost and still you come out as well as you would with a 2 per cent government bond.

Now, assuming that you are investing your money at a 7½ per cent return over a period of forty years as against the 2 per cent government bond, you could afford to lose 95 per cent of your original investment at the end of the first year, and the remainder, if it remained good through a period of forty years, would earn you as much as the 2 per cent government bond would. These are the figures showing the percentage of your original investment that you can afford to lose at different times. At the end of one year you could afford to lose 95 per cent; at the end of two years you could afford to lose 103 per cent; at the end of three years you could afford to lose 111 per cent; at the end of four years you could afford to lose 119 per cent; at the end of five years you could afford to lose 129 per cent; at the end of six years, 138 per cent; eight years, 161 per cent; nine years, 173 per cent; ten years, 186 per cent, and at the end of twenty years you could afford to lose 392 per cent; at the end of thirty years, 824 per cent; at the end of forty years you could lose 1,732 per cent for every dollar you first put up and still come out as well as you could on a 2 per cent government bond.

Now, we think that those figures prove conclusively that many people have sacrified an unwarranted amount of income for the sake of safety, because we can show that taking generally all sorts of enterprises that have been brought out by legitimate houses there has been no such loss as has been indicated there. By taking certain lines of securities the loss would probably not be a cent on the dollar.

Sometime ago I tried to figure out the loss which had been realized on gas bonds, and while I never got a complete record

of all the losses that had occurred, I am quite sure that I got the majority of them; and it was interesting to know that if I could have got all those lost it would not have amounted to as much as the money lost in deposits in national banks.

Imagine a man keeping his money in a national bank, drawing no interest, or perhaps 3 or 4 per cent, under the mistaken idea that he was entirely safe, when he might have had his money in a gas bond earning 5 or 6 or 7 per cent, and yet the historical statistics prove that those gas bonds are safer than the national bank deposits.

We mean to carry out this work here and determine, as far as statistics and every other source of available information will enable us, the showings of safe investments.

I have already done an enormous amount of work on it, and now that we have a competent statistical department they are spending more or less of their time on it.

Now here is a table showing the amount that can be lost at the end of any particular year and still yield the same result at the end of a forty year period as it would if it had been originally invested at 4 per cent compounded semi-annually; that is, you could lose 81 per cent at the end of one year; 109 per cent at the end of five years; 158 per cent at the end of ten years; 332 per cent at the end of twenty years; 697 per cent at the end of thirty years, and 1,466 per cent at the end of forty years and still be as well off as you could with a 4 per cent investment. You can lose at the end of the forty year period fourteen times as many dollars as you originally put into the investment and still be as well off.

One thing that has made all of this populistic feeling in this country is the belief that there has been an enormous amount of wealth accumulated in the hands of a few people, and that this great mass of wealth is weighing the whole community down.

I have never heard anybody contradict that statement. I think hardly anybody is conscious of how little our accumulations of wealth amount to. We are a country of 92,000,000 people, and we have accumulated over the period since the settlement of this country, some three hundred years, a total of $121,000,000,000. That amounts to about $1,300 for every man, woman and child in the country. If a man has $1,300, he is a man of average wealth. If anybody wants to make his young child a man of average wealth at twenty-one years, and should

invest his money at 7½ per cent, all he would have to do would be to invest $24.75 every year, and when that boy was twenty-one years old he would be a man of average wealth.

I would not give much for a fellow who could start off on an average basis with everybody else, and then could not give a good account of himself. It is rather interesting to know, however, that the men who give the best accounts of themselves never start with the average or above the average; they start off away below, showing that the incentive is the main thing, rather than having something to begin with.

As I said before, we have accumulated $121,000,000,000 of wealth. If the workers of this country were to save 3.23 per cent of their wages, and invest it at six per cent, they, in forty years, would have as much as the entire country has accumulated in three hundred years. If the man who has earned $1,000 a year would invest $32.32 at six per cent, the wage earners of this country would have as much in forty years as this entire country has accumulated in three hundred years.

Another interesting thing: assuming that that accumulated wealth earns an average, say, of six per cent (we know that a great deal of it earns more than that, and we know that a great deal of it is invested in municipal and government bonds, drawing from two to four per cent), or $7,200,000,000 a year, and that the individual earnings amount to $23,000,000,000, our revenue amounts to about $29,000,000,000 a year. We are spending more than $20,000,000,000 of that great sum—considerably more; and after all this talk of the enormous accumulation of wealth, and after these three hundred years of accumulation of wealth, we have only accumulated enough so that, if we are to continue to live at our present rate, we could live for only about six years; then we are through. In other words, we have only accumulated wealth six years ahead of our present rate of living.

To all intents and purposes, we can ignore the accumulation of wealth, and assume that everybody can start with a clean slate, because our national accumulated wealth is so small. The feeling that the great over-burden of our enormous accumulation of wealth is one of the things that is causing dissatisfaction throughout this country is a feeling about something that does not exist.

I shall show you a little later on that if it were not for our income from property, we are living at a rate in excess of our earning power; and one way of looking at it is this: This country has, ever since it was opened up, always lived in excess of its earning power. When you figure out the amount of coal that has been taken out of the ground, the number of natural resources that have been destroyed, it amounts to a great deal more than our accumulation of wealth; in other words, we have been drawing on our principal all the time.

I have a percentage table showing the increase in population, the number of workers, the workers' earnings, the income from capital, and the accumulation of wealth. These are all plotted with 100 per cent in 1780. Apparently the accumulation of wealth shoots up at an awful rate, but that is due to the fact that the accumulation of wealth started away below the population when we were just recovering from the Revolutionary War—so these tables can only be considered in relation to their positive; for example, the income from capital has grown 7,285 per cent, while the workingman's earnings have increased 9,600 per cent.

There is another way of showing the small amount of wealth that we have actually accumulated. If one family had come to this country when this country was first settled, three hundred years ago, and had invested $2,106 at six per cent, and had kept it continually employed every since, that one family alone today would have a sum equal to $121,000,000,000, or that one family alone, from that little investment of $2,106, would have an accumulation of wealth equal to that of this entire country after three hundred years of work.

Now, there is a serious side to that that perhaps goes beyond our time, although I can see how it might come almost any time. We have already progressed to the point where if we were simply to supply our everyday wants, and not continue to build for the future, there is not enough labor to go around and keep us all employed. We are continuing to substitute improved methods; we are substituting the machine for the man. There was a time when if you wanted power, a man got on a tread mill. The tread mill was a great improvement over no power. First, he had to do something with his hands without any tool at all, and gradually tools came into use. A tread mill was a great

improvement when a man could walk up a turning barrel and produce power; and then the time came when some fellow harnessed a water fall, and substituted waterpower for hand power; but that was not general, because the power had to be used at the point where it was generated, and as a rule it was the substitution of coal for waterpower that caused the next great step; then came the time when some fellow invented the steam engine, and coal takes the place of water; then comes along the other fellow who invents the electric dynamo, and thus we have waterpower taking the place of the man, and coal the place of waterpower, and that system keeps going on and on, until today we have substituted the telephone for the messenger boy, and we are even substituting the vending machine for the clerk.

In the old days it took at least twenty minutes to build a fire by rubbing one piece of wood on another; today the poorest workingman can earn fifteen cents an hour. He can go up to Wanamaker's and buy 1,000 fires for the product of his labor for twenty minutes.

The accumulation of property did not begin until property rights were recognized. Up to the time that property rights were recognized, the possession of property was simply an invitation to be robbed and murdered. With the recognition of property rights, man commenced to clear forests, commenced to produce farms; and from that time on the cost of all commodities was made up of two things—labor and rent of property.

Each year the use of power in the production of our commodities plays a more and more important part. It is unfortunate that the worker did not with the creation of property commence to own his share, but he did not. But everybody has been extravagant. There has been no great accumulation of property, and there is more reason now why the worker should do this than ever before, because whenever we stop building for the future there will not be enough labor to go around. Some day the average citizen must be a worker and a property owner, and if he is not a property owner, he probably will be, or may be, he and his family for generations, in the servants' class.

The accumulation of wealth has been very slow. I wish I had one table to show what that $600,000,000 would have been, that we had at the end of the war of the Revolution, if it has been compounded at 6 per cent.

I have figures here to show that the average accumulation of wealth for a decade has grown as follows: From 1780 to 1790, 3.26 per cent; from 1790 to 1800, 3.62 per cent, and it runs along between three and four per cent every year, except the decade between 1850 and 1860, when it increased at the rate of 18.17 per cent.

Taking the whole period of time for which we have gathered statistics, the accumulation has increased at the rate of 4.52 per cent per year, growing from $600,000,000 to $129,000,000,000 in 130 years.

Now, I believe that I have the basis here for an argument that will make people think, and will induce men to save. I am not through yet. No public attention has been given to the work that I have been doing so far, and I do not want any. What I want to do is to get the help of this group of men in making these arguments more effective, more impressive.

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The lamp companies are doing every form of welfare work for their men that they can, and from time to time they have tried to assist and help their men. They have gone over their men very carefully, and studied the way they live. They have been greatly disappointed that the majority of these men practically had nothing, even though many of these men had gone up from $75 a month to $300 or $400 a month—they were just as hard up when they got above the three or four hundred dollars a month as they were when they were getting $75—so they made up their minds that the matter of simply giving them more money did not help them much; which I might illustrate by pointing out that the accumulated wealth of this country is about $1,300 per capita.

Let us assume that we divided that up today. There is no reason to believe that ten years from now the division of wealth would be much different from what it is today. Simply giving a man money does not teach him how to get more of it, or even to keep what is given to him, the only assurance that a man can save money—can take it and handle it properly—is for him to accumulate it himself; if he accumulates it himself he acquires something more than the habit of saving; if he saves it out of his salary, he gets the knowledge of how to do it.

* * * * * * *

Now, I have watched workingmen with a good deal of interest. I believe that when you induce any workingman to try to accumulate money, or when you try to get him to building a home, or anything of that sort, you are making a more efficient workman out of that man. It tends to make him a more efficient workman; it tends to improve his morals; it tends to discourage him from being a striker—that is, it takes away that peculiar irresponsibility that many workingmen have, who are ready to throw their tools down at any time and go out.

I have not yet got to the point where I want to say anything to our men that will discourage them from home buying, but my actual observations up to date, which I hope I can prove to you are not untrue, are that about the worst thing in the world a man can do is to buy a home. It is about the worst investment a man can make. It takes a rich man to own a home, and a man is always better off renting his home and buying interest-producing property, instead of trying to buy non-income producing, expensive, residential property.

On the other hand, of course, the purchase of a home and the responsibility he assumes has a mighty sobering effect on him; and to that extent it is one of the best things he could do.

I think some time we want to take up this subject of our men buying their own homes, because if it is true, as a rule, that it is a poor investment, it is our duty to call our men's attention to that fact.

I think that another thing which has been pernicious in preventing workingmen from saving, and which has been a load around his neck that lasted frequently until he died, is life insurance in the usual forms.

At one time every one was talking about life insurance, and then I recall that under the guise of doing a life insurance business, the insurance companies ran wild, and they started a lot of quasi-investment schemes with life insurance hinged on as an incidental. Those various schemes kept many a poor man's nose to the grindstone all his life paying premiums on them.

Any young man who has nobody to take care of but himself, does not want any life insurance. If he is about to get married, what he really wants is term life insurance. That ought to be the cheapest thing in life insurance. Not more than one young man in twenty-five in good health needs carry

or wants life insurance beyond that period of life when he is putting himself in shape to take care of his family. He ought to be able to insure his life for a period of six or eight years, whatever time he thinks it would be necessary for him to have it, while his family is young, and before he is enabled to carry his own insurance.

It is not my ambition that our company should start into the life insurance business, because we don't want anybody to start into our business; but later on that is one of the matters we must take up, and endeavor to get the life insurance companies to give the men a good, straight, honest term insurance policy during the time we are teaching them to provide their own life insurance.

The risk on a young man from twenty-five to thirty-three or thirty-five, or from twenty-two to thirty, ought to be very small.

I believe in welfare work for men—and I just mention that matter of insurance incidentally—I think our welfare work for men can take a practical turn in no way philanthropic in the sense of being charitable, but we can show him how to live. What we want to do is to find that way of taking care of our men which gives them the most for the maximum amount we are able to pay; in other words, what we want to study here is not what everybody is doing, or what other companies may be doing for the sake of public applause, but to study out how, with the maximum wage we can pay them in any form whether it is pensions, or anything else, how we can do the most good for them; and while we are talking about one specific thing, I could not resist the matter of the home buying and the opportunity to show you how my own mind is working.

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I feel, for instance, that the labor unions of this country have really never done anything towards bettering the cause of labor. So far as I know, no labor union has really attempted to do anything except to get higher wages. The one important thing about labor is the same thing that we have in our electric light plants, and that is the load factor. I have often seen some sort of industry, say a job of construction work in a certain locality, which was so behind, that for the moment the contractor would be ready to pay almost any wage to get employees.

taking these employees at a higher wage over to this construction enterprise, perhaps to the ruination of all other enterprises, such as the small settler, or the small manufacturer. Then, when the construction work was over, these men were turned back on the market without any means of immediate employment.

It is not unusual for boards of directors to sit down and, without any regard for the welfare of their men, to just order things cut to the quick. I sat on a number of boards during the 1907 panic, where there was not the least compassion shown for the employees of the company; and many of those men are the men who talk and prate the most about what they do for labor. When the panic of 1907 came, the orders were: "Cut your men down; discharge them; let them go."

I just mention this to show how little the really essential things have been touched on in any labor movement. You know the public believe the only thing they are interested in in regard to gas and electricity is low rates. The public are not interested primarily in low rates. They are interested, first, in a complete service from a geographic standpoint. There is no satisfaction, for instance, for John Smith, who lives a little off the beaten track, to know that John Jones who lives in the heart of the city, can get gas for 90 cents rather than $1 a thousand when he cannot get it even for $1.50. So, the first thing they are interested in is good, complete service from a geographic standpoint.

One of the first things for an employer to do is to try to take care of his load factor, so that it fits in with the load factor of somebody else, and his men can therefore have the maximum employment throughout the year.

The second thing that the consumer of gas and electricity is interested in is not low rates, either. The second thing is good service. Low rates do not compensate for unsatisfactory service. It is of far more important to have satisfactory service than to have low rates. I venture to say that simply the maintaining of a proper pressure on a gas service and the furnishing of reasonably good appliances for the use of gas will give the consumer greater satisfaction than service at 75 per cent of what the cost would be with fluctuations in pressure and poor appliances.

The company is selling a commodity, while the customer is buying a service, and the service is not necessarily in relation to the number of kwh or the number of cubic feet of gas.

Labor is interested primarily in a good load factor.

I believe, secondly, in proper, healthful and safe operating conditions, something to which, as far as I know, no labor organization has given serious consideration; something to which we do want to give serious consideration here.

It is rather unfortunate that in this country we try to cure all common human ills with an axe or with an oration or with a law. The problems that we meet in matters of this sort are exactly the same problems as we are meeting in trying to keep yellow fever out of the country, or trying to reduce epidemics of disease, or many other similar things. The man who has an intolerant opinion and is intemperate of speech could do nothing to cure those problems. Neither can that same man do anything to cure these human problems that are in evidence on every hand. They have got to be cured by the thinking men, the scientific men; and it is certainly unfortunate that we, as a country, are led and ruled by the men who can talk, instead of by the men who can perform. The sooner we recognize that the man who carries around an intolerant opinion, and who is intemperate of speech cannot effect anything, the better off we shall be.

The differences between capital and labor have sprung up almost entirely from a set of demagogues in this country. To be rewarded with public office requires a majority of votes, and the majority of votes are with the earners, the wage-earners. There is hardly one of these men who is not willing to accentuate the error that the wage-earner is the source of all wealth, if by so doing they can curry favor with him. They are all fond of telling you that the basis of all wealth is labor. Nothing is further from the truth. The basis of all wealth is our natural resources. Labor is just an accident in making those natural resources valuable.

There was a time before our period of civilization when nobody ever attempted to produce anything. They simply attempted to reap what nature had sown—to kill the wild animals that ranged the forests, and to pick the berries that nature provided.

The time when property rights were recognized and we became sowers, was one of the great steps in political economy.

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I do not want to comment too definitely upon the policy that we should pursue in regard to accidents. I feel that in many ways the handling of our accident insurance through insurance companies often works out in the worst sort of brutality. We are unable often to do anything for our employees without committing ourselves legally, and yet there are times when people are so pressed that they must accept almost any sort of a settlement, and very frequently aid does not reach them in time to be of benefit.

I do lay it down as a principle that we want to do everything that we can to relieve suffering and misery in case of accidents, and just how we are going to do that I am not clear in my own mind; and, therefore, do not want to change in advance the opinions that others might have.

Mr. Stannard tells you about the benefit association in Denver. I was heartily in sympathy with the formation of this, but did not take an active part in guiding it along the lines that I would have believed correct.

In the first place, when you provide means of that sort for men to take care of themselves in case of accident or sickness, it seems in one way as though you have done everything you could. If they don't avail themselves of it, the penalty must be a certain degree of suffering. You can only make these things voluntary. They must be made voluntary, and the very man who needs it most is the man who is apt to stay out.

I feel, however, in the plan suggested by Mr. Stannard, it would have been far better if all premiums had been based on the wages received, and all benefits based on the wages received, the premiums to be a certain per cent of the wages paid, and the benefits also to be a certain percentage of the wages paid.

I am very much opposed to the pension plan. It is one of the most effective methods I know of to discourage thrift. It also introduces untrue economic conditions. Without the promise of a pension many men would lay up money to provide themselves with a fruit farm, or something like that, for their old age, when they become incapacitated for active, stren-

uous work. With the promise of a pension if they hold on, you are apt to have men in your employ who are no longer very efficient, who otherwise naturally would have left your employ. Not only that, but if you are going to pay pensions only to those men who have been in your service for a long period of time, then the men you pick up temporarily, and who never reach their twenty-year period, or whatever is recommended in this report, never do get a pension.

Taking another view of the thing, if all public service corporations provided pensions for their employees, how is a pension going to be provided for the laborer who is compelled to work for contractors and to secure temporary employment from time to time? To be just between that man who is fortunate and in finding employment with a public service corporation and that man who is compelled to do the other work of the country which is not continuous and in which he never gets a standing with anybody long enough to secure a pension, it looks to me as if the government would have to step in and provide that man with a pension. When we say that pensions are correct and should be paid, we are laying the foundation that the socialist wants us to lay—a foundation that will provide for pensions paid by the government; nor is it possible to pay pensions and do it justly, because there are some men who never could acquire the length of time necessary to secure pensions.

If a man cannot draw any pension when he has left your employ, and he has had to work, through force of circumstances for fifteen or twenty companies, that man is barred forever from having a pension. I see no way of working out the pension plan so that it is not a menace to labor, rather than a help to labor.

It has not been my experience that the payment of pensions, profit sharing, or anything of that sort increases the efficiency of labor or prevents the employe from soldiering. The sentiments, however, that lie behind these things often produce an esprit de corps among the workingmen which does take care of those particular things; but, assuming that you have, as we have in Denver, a thousand employees, the little additional work that that employee might do to make the company effective, simply because he is a stockholder or profit sharer in the company is not apt to stimulate him, for he feels that the success

of that company depends upon the other 999 men primarily, rather than on himself.

I am a believer in profit sharing if it can be worked out in some effective way, but I have never seen a way of working out profit sharing so that it accomplished a great deal of good. That is, profit sharing where the company simply donates the profits. And in almost every one of these schemes the employee has simply got benefits; they did not stand reasonable losses, nor did they stand reasonable risks. Perhaps some method of profit sharing can be worked out, but as yet I have seen nothing that appealed to me.

The plan of the Electric Light Association appeals to me more effectively than any of them. By that plan the companies pay a certain proportion of their net earnings into a profit sharing fund, and then they divide that up by committee, giving to each man a proper portion of that, depending not on his position or on his salary, but depending upon his effectiveness in creating those profits. If that could be done wisely and everybody could feel that it had been done wisely and fairly, that should be an effective method of dividing profits, because you are directly rewarding merit according to the effectiveness of the service rendered; while most of the profit sharing schemes pay the same to the slacker as they do to the worker.

That plan has one inherent defect, which I am afraid will make trouble; that is, many men cannot believe the plan had been carried out justly, and therefore it is liable to defeat its very purpose by making some employes dissatisfied.

I have often wondered what would happen to a company that was owned entirely by the employes, and I seriously doubt in such a company—a corporation having several hundred employes—whether it would be possible for them to manage it successfully—whether their interest as workmen would not predominate over their interest as stockholders, and therefore if they would not make it impossible for that corporation to economically produce goods and sell them in competition with others.

One thing that made a great impression on me this past summer, when I was taking my vacation, and which largely took the form of investigation into the European conditions and trying to think out better plans or methods for our own work over

here, was the fact that labor-saving machinery is in use abroad to a far greater extent than it is in use here; and, in spite of the fact that labor over there is very much cheaper, it is not uncommon at all to go into a German plant and see them operating machinery at a cost of, we will say, 20 cents, while the product could be turned out for by hand labor at a cost of 15 cents.

Now, the situation is pretty serious when men are willing to pay 33⅓ more to have work done by machinery on account of the reliability of that machinery as against human labor. Very much of everything that scientists and business men are doing is toward the elimination of the necessity for labor; strikes and the unreliability of labor are stimulating to an unwarranted degree, from the proper standpoint of economics, the substitution of machinery or other methods of operation which will eliminate the necessity of labor.

We have a serious condition in this country, which no one has yet dared to fight. When we speak about sympathy for labor, or an attempt to do anything for wage earners, as a rule it takes the form of helping organized labor. For me to be thoroughly in sympathy with organized labor, organized labor would have to be thoroughly in sympathy with all wage earners, and we, it seems to me, are approaching a period when it is going to be organized labor against unorganized labor.

The most highly organized labor country in the world is England, and that country has the largest number of unemployed people, and the largest number of poverty stricken people. I believe that has been almost entirely due to the strength of labor unions over a number of years. Our work ought to be directed always to labor as a whole, wage earners as a whole, rather than to organized wage earners.

The committee particularly recommended that any attempt at investment savings should be made voluntary on the part of the employee; the money should be first paid to the employee, not deducted from his wages, and he should voluntarily turn it over to the fiscal agent. That is one portion of that report that I am not in sympathy with, because men will not part with their money without pressure after it is in their possession. Pressure takes the form of supporting their own moral courage; and you can best support their moral courage by getting them to give an order in advance against their salaries. If you are

going to make investment savings, or any form of savings, effective, it can be made more effective by getting a man to give an order for his pay when he is in the humor for it, rather than when he gets his money in his hand. We know, as practical men familiar with labor conditions, that many of the men will not turn it back.

The prime thing that I believe will help our men is the effort to teach them the value of a dollar, which can only be done by telling them what a dollar will do. When they start in to try to save money, and try to invest it to advantage so as to get ahead, you are going to direct their attention to how to use their money properly and how to get the most out of the dollar they do spend. We can supplement that from time to time by helping them in various ways to get the greatest dividends of happiness out of the wages we are able to pay them.

We have not talked plainly with the working men. We have not told them that they have not contributed as much to the wealth and material comfort of the world as many others have. It is a fact that the ordinary workingman can live now with greater comfort, greater physical and material comfort than a king could two hundred years ago, and the men who have contributed to that are our great inventors and our engineers and industrial organizers, and the workingman has simply gone along and reaped the benefits. We have all reaped the benefits of the work of these men who, as a rule, have been very inadequately paid for their great labors and achievements. If someone will tell the wage earners of this country the truth, it would be the greatest service that could be done for them.

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One of the things that was not covered in this report is, to my mind, most important in trying to relieve the conditions of some of our employes, and that is the loan sharks. The other morning in the paper was reported a case that came up in one of our courts where a woman had borrowed $100 from one of these loan sharks, and had paid $240 interest on it, but has not yet been able to pay the $100 off.

That thing is always with us; it is more or less prevalent. It is considered a very ungentleman-like thing to loan a fellow employe money and charge him interest for it. If we could wipe that feeling out and allow the man in a large company

who has money to lend it; let him be a money lender and compete with the loan sharks, you would go a long way towards bringing down the rate of interest to a more reasonable point.

Another way would be for the company itself to provide an employes' loan fund, and charge them, say, one per cent a month for that money. Then you have a chance to get a majority of your men to come directly to you, and you can find out why it is necessary for them to have money, when they are being paid a regular wage. You would not entirely eliminate the loan shark in that way, because many men would have a diffidence about coming before a committee of their associated employees, or in coming before a committee of the company; but the loan evil is one of the greatest curses we have.

The government has tried to deny the law of supply and demand, and it has said to charge any rate of interest above 6, or 7, or 8 per cent, is a misdemeanor or a crime, or something of that sort. I am just waiting for the government to contradict effectively the law of gravity, and then I am going to give you all a perpetual motion machine, and we shall not have to buy coal any more.

Our law makers think they can by law change the laws of supply and demand and other natural laws, which they cannot do, and undoubtedly this loan shark business can be traced back to the assumption on the part of the government in supposing that they can change natural laws.

Another point that I wanted to make was this: Our ideas about health are changing very materially. I remember only a few years ago, and it is still the case, where a great many men think it is the greatest hardship in the world to work outdoors, that they ought to be provided with shelter, and especially be protected from the cold.

My little niece attends the Horace Mann School in New York and always has, since she graduated from the kindergarten. She is a little girl eight years old, and this winter has been the most severe winter that we have had in New York for many years. She has gone to an outdoor school on the roof while there, and there can be no doubt about the improvement in her health.

That is simply one illustration of our modern notions of health, cleanliness and matters of that sort. We used to think when we washed a thing we made it clean. Now we find out

if we want a milk can to hold milk that won't sour, we have to steam it or use some kind of sterlizing treatment.

I have been trying to figure out what is the most vitally exhausting work that we have to do around our plants, and how to eliminate it and make some of our conditions more healthful. I have assumed that the hardest work to do around our plants is, first, the clinkering of producer gas fires in furnaces. That is something from the humanitarian standpoint that I have already worked out by producing a furnace that will work without any clinkering.

The next hardest work I assume to be hand stoking in a gas works, and our engineering department is now at work on plans which I think will eliminate all hand stoking, in fact, eliminate stoking, as it is understood now, either by machine or hand.

The next hardest thing I consider to be doctoring in a gas works, that is, cleaning out stove up standpipes, and so forth. That can be eliminated largely by a change in the nature of our rotary houses on the additional houses that we build. If any man has ever worked on an outdoor coke oven plant, or an indoor one—I know of no indoor coke ovens in this country, but you can find them abroad—there would be no question which he would prefer to work in—the outdoor plant every time.

By changes that we are making in our engineering department we will probably eliminate the necessity of doctoring altogether, but where doctoring must be used, it makes quite a difference whether it is an inside or outside plant, or a mingling of the two, such as Donald McDonald has in Louisville, Kentucky, where it is on the roof.

The next hardest thing is in boiler firing. Most of our plants are today equipped with mechanical stokers, and we are now making a further modification in our plans for boiler firing, which will eliminate all hard work in a boiler room. Everything from the coal pile to the ash pile, from coal on cars to ashes on cars, will be handled entirely by machinery, and we will have machinery runners there to handle it rather than manual labor.

> There is no limit to labor or the possibilities of opening up new commerce and new industries.
>
> —HENRY L. DOHERTY.

The same subject—thrift—was the keynote of Mr. Doherty's address before the Philadelphia Electric Company Section of the National Electric Light Association on April 15, 1912, when he said:

MR. CHAIRMAN and Gentlemen: If I needed a hearty welcome to make me feel at home, your welcome would certainly accomplish all that you intend. I am glad that I was here to hear the report of your Membership Committee. The company section movement in the National Electric Light Association, the work in forming the company section, and developing it, is due primarily to the work of one of your fellow-workers, Mr. W. C. L. Eglin. It probably represents the most important step that the National Electric Light Association has ever taken for the progress of the industry. And incidentally, I believe that it will prove to be the most important step that the employees of any company have taken in behalf of their own welfare.

I like to see the company sections of the National Electric Light Association grow in importance. I expect to see their work become more influential, to be the subject of greater notice on the part of the National Electric Light Association, and I look to see a great deal of the important work of the National Electric Light Association done in the company sections. Not only that, but I look to see the time when we are going to look, in a national body, for talent both for programs, for committee work, and for officers, by studying the work done by the local company sections, by looking for the man who has been able to run his section and get the most out of it, by looking for the man who has been able to do the most important work for the company sections. In many other ways, the company section will prove to be of greater and greater importance to the employees of the various electric companies.

I am not here tonight to talk to you directly on the subject of electricity or the development of the central station. Perhaps I am geting to be a back number on that particular problem. For a number of years, I have been chained pretty closely to a New York office and away from an operating company. I read with a great deal of interest Mr. Russell's paper, for instance, that was awarded the gold medal prize last year, and it is rather

interesting to know that one of the pieces of work that I did, which perhaps gave me more prominence in the electrical world than any other piece, was in line with the paper read by Mr. Russell. In other words, his paper had to do with the fundamental theory which underlies rate-making, and in fact, underlies all operating work, and the paper of mine that attracted the most attention was a paper on rates read at the Electric Light Convention in 1900—I am ashamed to say that I do not remember the title of it, but it was rather interesting to know that there were very few calls made for that paper during the first six months after it was read, and I think the twelfth six-month period after it was read, there were something like twenty times as many numbers of the paper called for as during the six months after the paper was read. Since then, there has been a world of good work done on that subject, and I think the best paper I ever saw on that subject was the paper read by Mr. Russell before your section. The treatment which was accorded my own paper will encourage Mr. Russell to think that perhaps six years from this time his paper will be still better appreciated than it is now.

My subject tonight is one of thrift, of trying to make of the wage-earner, of the salaried man, a capitalist. We are all entitled to our hobbies. This has become a hobby with me. I hope to see the thing that I am interested in become a national movement. I believe that it will. I believe that it will do more to correct political and industrial conditions than anything else that we could promote.

You probably know that the National Electric Light Association has been busy the last two or three years, and especially through the Public Policy Committee, on the general subject of welfare work for employees. I have given a good deal of thought to this subject, not only with your Public Policy Committee, but also independently, and alone, and for a great many years prior to the time your Public Policy Committee took up this work.

I believe that I am in a little different position from the average man who attempts to take up this problem, for he has seen but little of the wage-earner's side. I have been a wage-earner in a real sense, that is, I have done manual labor and I have been a worker since I was a boy of nine years. That is, I have always supported myself to the extent of buying my own clothing since

I was nine years old, and have helped to support a family since I was twelve. In doing that, I not only have done boy's work and work of that character, but I have done actual work, such as being the tender of a machine, I have worked on an ice wagon, and I have done work of that sort. For a number of years, I was foreman of a gas works, and my associates were those workmen, —many of my best friends were those workmen, and some of the men I admire the most today, when I look back, are men I have met who were individual men and great men—I can number at least one man among those great men who could neither read nor write. I believe I know that class of people better than the average man knows them who is the officer of a corporation.

You probably have your regular report of the National Electric Light Association—the report of the Public Policy Committee. I will not attempt to discuss that report in detail. There is no way in which I could help my men more than if I could induce those men to spend their money intelligently. I believe that I can do this indirectly by trying to teach them the value of money, and in doing this work, I am anxious to secure the help and the advice and the assistance of every one who believes, after hearing what I have to say, that the particular problem in which I am interested now, deserves support. If you believe that the thing that I am working on is practical, and that it deserves support, I will appreciate the help of any man in this room towards making it a practical thing.

Starting now with certain fundamental things, all wealth, all revenue, all revenue to the individual is represented by two things, first, labor; second, the rental of property. That is, take a property such as the Philadelphia Electric Company is using. To furnish service, there must be a rental paid for the use of that property, so that the charge to the consumer represents labor and rent of property. That is the only way that any of us have of getting an income, either by labor or by the rent of property. Unless we own property, we cannot rent it. I believe it is possible for every man to become a renter of property. I believe that every man should become a renter of property if he is to be a good citizen.

You hear a great many men say that the accumulation of wealth in the hands of a few people is a menace to the country.

I believe that, and I believe that the tendency is for the wealth of this country to accumulate in the hands of a few people. I do not mean by that that the wealth of the country is accumulating in the hands of fewer and fewer people; I mean that it does accumulate in the hands of a few people, although this circle of a few people is constantly widening. But, nevertheless, the number of people who own the accumulated wealth of this country are small in number, and the theory of those people who believe that is not the best thing for this country, is that they are going to take it from those who have it. That is not my theory. My theory is that we are going to give it to those who do not have it, or rather, we are going to give them an opportunity to acquire it, because there would be no use to give it to them.

If you were to take the accumulated wealth of this country and to divide it equally between everybody in the country, I am inclined to think within a few weeks it would be back in the few hands that have it now. Whether that is true or not, I am sure there would be about as many people broke in a few weeks as there are today. I often think of Dan Cummings, who was one of my great friends and who was a teamster for the Columbus Gas Company. He had been employed down at the mill, and when he worked down at the mill, he could make five and six dollars a day, but as a teamster for the gas company, he only made about two dollars a day. The mill wanted to get him back, and they knew he was a friend of mine, and they came to me. Daniel was a great whip. The mill paid their men twice a month, and we paid our men once a month. And so I told him that Mr. McCallaway had been up there and wanted him to go back to work at the mill. He said, "What do I want to go back to work at the mill for?" I said, "You can make bigger money down there." He said, "I don't know that that makes any difference. When I worked at the mill, I was broke twice a month, and now I am only broke once a month."

I was in another city not long ago, talking on this same general subject. We had a dinner previous to the meeting. The conversation of the dinner turned on the opposition and resistance and the antagonism towards corporate wealth, and the antagonism and unfriendliness of the general public towards those people who were representatives of corporate wealth or accumulated wealth. One of the men at this dinner said to me,

"Mr. Doherty, if I were situated as you are, I would put everything I owned into good first mortgage bonds. I would go over to France, Italy, or some other place where it is pleasant to live, and I would stay there until this wave of antagonism has passed, and when this wave of antagonism has passed, I would come back and go into business again with renewed vigor at a time when there were not so many obstacles in my road." I asked him how long he believed it would be before this antagonism and resistance would pass away. He said, "Oh, it cannot last much longer." My reply was that I believed it would last a long time, and it would last just as long as our present conditions maintained. I called his attention to the fact that while the wealth of this country had been accumulated in a few hands, that we were a country ruled by majorities, and that we never were going to have peace and harmony until the class of people who owned the accumulated wealth of the country was materially increased.

You cannot sit down today in any directors' meeting or in any congregation of business men, but what they will complain bitterly about the opposition on the part of the government, the opposition on the part of the press, the platform and the pulpit towards business progress; that is, that there is resistance and antagonism which tends to prevent business progress. You will hear that complained of all the time. It is unreasonable for these men to believe that we are ever going to have harmony, that we are going to have the support of our people, that we are going to be able to get along without resistance, until we make at least the majority of the men in this country property owners, and not only property owners, but owners of corporate wealth. It is not enough for them to be the owner of a home, but if we are to have everybody in sympathy with corporation work, they must be holders of corporate wealth in one form or another.

Going back a moment to the other side of this problem and taking up again the points in which I said that I believed, I could do no better work for my men than to teach them how to spend the money that they must spend. I realize that it is impossible for me to be at their elbows when they are called upon to spend a portion of their wages, but if I can show them how they can make such portion of their wages as they can save, grow, and become something of importance to them, if I can teach them

the value of a dollar, if I can get them interested in trying to save their money rather than to expend their money, I believe I will do them more good than I could do them in any other way.

I have seen a great many of my men go from a salary of a few ten dollar bills a month to many hundred dollar bills per month, and I am sorry to say that some of those men were just as well off when they were getting a few ten dollar bills per month as when they were getting several hundred dollar bills per month. In other words, a man is poor, no matter how much he gets, if he lives beyond his income, or if he lives clear up to his income. And a man is poorer who has a good income and lives entirely up to that income than a man who has a small income and lives up to that income, because the bigger the income is, the more opportunity there is for shrinkage, and once a man has educated himself to live on a plan of five hundred dollars a month, it is a great hardship for him to come down to a matter of one hundred dollars a month.

We, as employers, have perhaps not only not done all we could to encourage our men to save money and to show them how to profitably invest it, but we have perhaps discouraged them—we probably have discouraged them. I am inclined to think that if any of you men were to go to the officers of your company and ask their advice about an investment, you would get advice that was intended to be good advice, but after all, it would be their advice, and in spite of the fact that I know practically every officer of your company and I know that they are more progressive, broader minded than you would find in one corporation out of one hundred—yes, probably out of one thousand—if any employee were to go to his employer and ask for advice as to the investment of money, the first thought that would come to the employer is that he must make a recommendation of something that was so safe that it would be impossible for an employee to lose his principal, and the result would be that he would recommend a government or a municipal bond, in spite of the fact that that would mean an income so low that there is hardly any encouragement for saving, and in spite of the fact that that same officer of your company would no more think of putting his own funds into such an investment than he would think of letting his money lie idle. But he would feel that he must not take the responsibility of recommending something on

which there might be a loss, and therefore, he would recommend something overly conservative so that he would not be a party to claim should any accident happen to the principal.

I have realized, in working out this problem, that I must accept the responsibility in recommending to my employees exactly the same sort of an investment that I would make if I was in their position, but I am willing to take that responsibility and I am willing to try to induce other employers to take that same responsibility. Perhaps most of you know me as an engineer. I worked for years as an engineer. The last few years of my work has been more generally that of a financier. I have been unable to find any fundamental science in finance. If such a science exists, I cannot find it, and I cannot find anybody that can find it. In other words, in the world of finance, things are done by opinion, by rumor, by the intuition, by hunches, and other ways. We, as engineers, have exact methods by which to work, and I started in a great many years ago to attempt to apply engineering to finance. I have not gotten very far, as yet, but I hope to get a good ways before I get through, and I do know that so far I have been able to apply engineering to finance, and I have been able to make that engineering tell for the lack, and abundantly take the place of the lack of many years of experience. We have found ourselves able to do a great deal by applying exact methods to finance, the same as we would to the building of an electric light plant, and we did not find that lack of many years of experience in financial work handicapped us.

I am trying to start a movement which is nation wide, to get the wage-earner to become a capitalist. I want to see the time when every wage-earner receives a large portion of his income from his holdings of securities in corporations. I am after a little different class of people from my audience of tonight; I am after you folks as assistants, but I am after the fellow clear down at the bottom of the line, and I want the men of the agent type, such as I see here, and what I refer to as the salaried man, on up to the high-brows—I want their help in reaching that man. I am going to show you some figures—I am going to hurry over the high points of a lecture intended to make the wage-earner see the necessity for saving his money, and to induce him to save it. I believe that to carry out a movement of this sort, it is necessary to apply to men in groups. That is, you must find

some sort of a natural group and apply to the men in that group, because I feel it is difficult to give one man the moral courage to live economically, to save his money, and invest it, while everybody else around him is spending their money lavishly. But when you apply to men tied together in a natural group, and especially the best form of a group, that of a group of employees, the moral courage you are able to put into one man to induce him to live economically, save his money, and invest it, is supported by the friends of the man whom he is working alongside of, and that, I believe, is going to be a great factor in trying to carry out this general scheme.

I am going to start by showing you an interest table, showing the value of money at various rates of interest. That is how a dollar grows at various rates of interest. In this work I have taken what I term natural periods of time. I have taken three score years and ten—that is, 70 years—as representing the natural lifetime—the lifetime that goes on without interruption. I have taken the period of 40 years as representing a man's working lifetime. I have taken the period of 21 years as the period from the birth of a child until that child becomes of age. A man is, or should be, an investor during the entire time he is a wage-earner, plus the time that he is in retirement, and probably a better period of time to have taken for the period for which a man is an investor is a period of 50 years. I doubt that 40 years as the working period is correct. That is, there are many men who work more than 40 years. I will have completed a third of a century of work on the first day of next February, and yet I am only forty-two years old—not yet 42 years. Now if I work until I am 60 years, I will work something like 51 years. Taking 22 years as the average time when a boy finishes his college course, if he works until he is 62, he has worked 40 years. But I would say that the average working period of a man's lifetime is more than 40 years. I would say his investment period, because his investments go on after he ceases to be a worker, is 50 years.

My tables are made up on the three periods, 70 years, 40 years, and 21 years. I have taken certain rates of interest, on this first chart that I will show you, running all the way from two to seven and one-half per cent. I have taken two per cent as representing a government bond. I have taken seven and one-half

per cent as representing what I believe it is possible to earn by judicious investments properly chosen. The intervening figures represent various things. The two per cent government bond is taken as representing the Canal Bonds, the Panama Canal Bonds, which were offered for a popular subscription, and they were put out in denominations of twenty dollars. If you own one of these bonds you get a check for ten cents every three months from the Government.

Many of our municipal bonds are four per cent bonds, and they are the next favored investment, from the standpoint of safety. Most corporate bonds are five per cent bonds. Most corporate preferred stock is six per cent preferred stock. Many of the six per cent preferred bonds sell at less than par. Nearly all of them sell at much less than par when they are first issued, and during the last four or five years we have passed through a period of particularly low security values. For instance, the government debt of Great Britain is not represented by bonds, as it is in this country, but it is represented by what may be termed a stock, distinguishing now between bonds and stock in that stock never becomes due, while bonds have a definite period at which they must be paid. Great Britain's debt is evidenced in what may be termed stock, and is commonly known as British consols. They bear two and one-half per cent interest on their par value, and up to a few years ago they used to sell on about a two and a half per cent basis. But during the last few years they have sold more nearly on a three per cent earning basis, going as low as three and one-quarter per cent earning basis. That is, a two and one-half per cent government stock could be bought as low as, say, seventy-six, or seventy-seven in the market, in spite of the fact that it at one time sold at par. Just as good as it was before, but there has been a different notion of value in the mind of the public. We have gone through a period where all securities, municipal, corporate securities, and everything of that sort, have sold at what might be considered as twenty or thirty-three and one-third per cent below normal, provided the period that existed prior to 1906 or 1907, and for the preceding fifteen years, would be represented as the normal. Now it may be that we are in a period—it may be that we have reached the truly normal in security values, and it may be that these low values will go on. I do not believe that that is the case. I believe we will have a

substantial appreciation of values of all sorts of securities. In fact, we have already had a general appreciation in security values, and I look to see a more decided appreciation during the coming twelve months. The appreciation that is going on has already been so marked that it cannot go much further without my being compelled to modify my figures, and I will have to get out some new charts. We have seen seven per cent preferred stock sell as low as ninety during the past year. I may cite one stock, that of the big dry goods combination in New York City, which I believe has millions of dollars over and above the full issue of the preferred stock, and that particular preferred stock was put out at one hundred and ten, and I think shrank as low as a value of nine-two—or it sold on the market at a price which would yield an income of better than seven and one-half per cent.

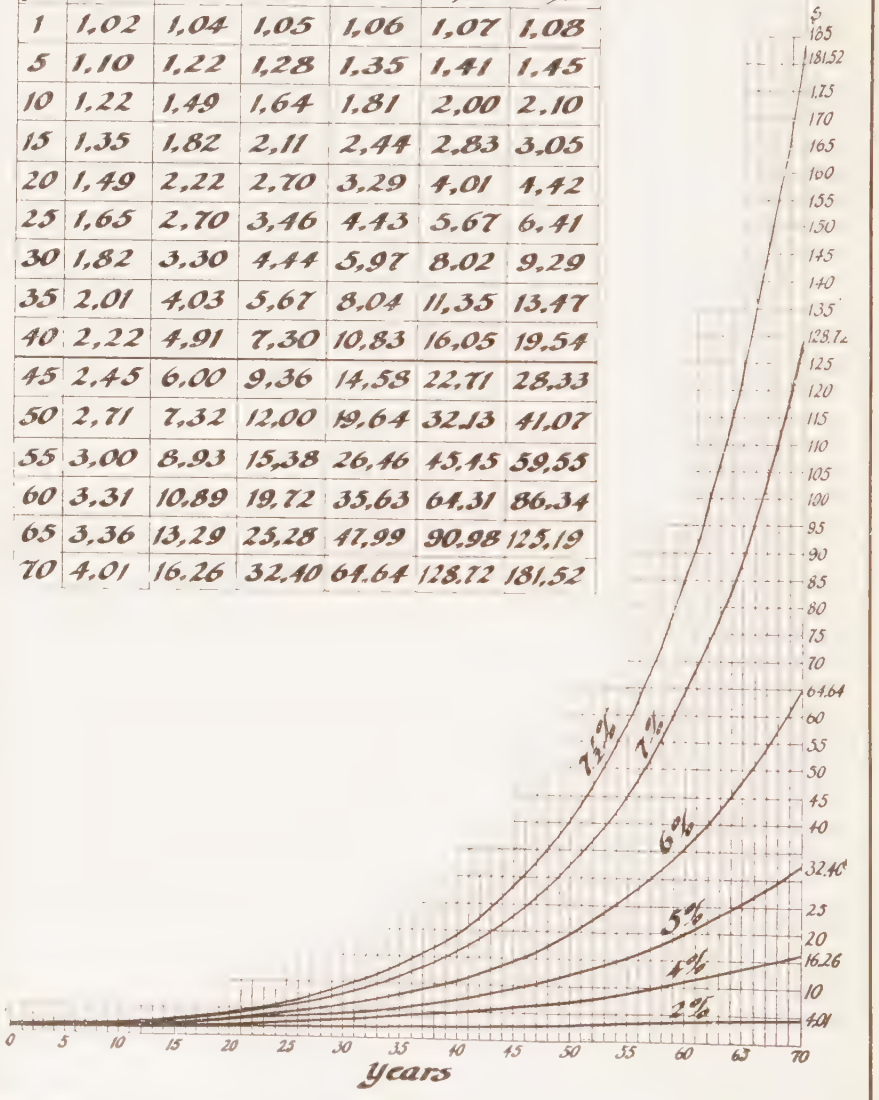
Now I have taken from a general study the fact that for a great number of years a man could realize from proper investment not less than seven and one-half per cent on his money, and take very little chance of loss. But I am talking about principles and not rates, and I don't want you to get mixed up simply because I state certain definite figures. I referred in the opening of my address to the paper I read on rates in 1900 to the National Electric Light Convention, and I purposely did not want to advertise to the public at what a low price we could manufacture current, so I took an example that would give me the highest possible price, and, to my surprise, I found that ninety per cent of my hearers lost sight of the fact that I was using a specific example, and not data, and they were quarrelling with data when I was trying to teach them a principle.

I am trying here to show certain facts, whether my assumptions are right as to interest rates or anything else. You will have to do your own figuring about that.

On page 96 is a chart that represents the value of a dollar when put out at different rates of interest, if this interest is compounded quarterly. You will notice that the first column is two per cent, and then on up to seven and one-half per cent. The two per cent column shows that one dollar compounded quarterly at two per cent amounts to two dollars and twenty-two cents at the end of forty years and amounts to four dollars and one cent at the end of seventy years. At four per cent, a dollar amounts to sixteen dollars and twenty-six cents at the end of

One Dollar Invested for 70 Years With Interest Compounded Quarterly At 2%, 4%, 5%, 6%, 7% and 7½%

Yr.	2%	4%	5%	6%	7%	7½%
1	1,02	1,04	1,05	1,06	1,07	1,08
5	1,10	1,22	1,28	1,35	1,41	1,45
10	1,22	1,49	1,64	1,81	2,00	2,10
15	1,35	1,82	2,11	2,44	2,83	3,05
20	1,49	2,22	2,70	3,29	4,01	4,42
25	1,65	2,70	3,46	4,43	5,67	6,41
30	1,82	3,30	4,44	5,97	8,02	9,29
35	2,01	4,03	5,67	8,04	11,35	13,47
40	2,22	4,91	7,30	10,83	16,05	19,54
45	2,45	6,00	9,36	14,58	22,71	28,33
50	2,71	7,32	12,00	19,64	32,13	41,07
55	3,00	8,93	15,38	26,46	45,45	59,55
60	3,31	10,89	19,72	35,63	64,31	86,34
65	3,36	13,29	25,28	47,99	90,98	125,19
70	4,01	16,26	32,40	64,64	128,72	181,52



seventy years. At five per cent, thirty-two dollars and forty cents, and at six per cent, sixty-four dollars and sixty-four cents.

At seven per cent, one hundred and twenty-eight dollars, and at seven and one-half per cent, one hundred and eighty-one dollars. You will note that while your interest doubles up here, your interest rate doubles and your return is four times—that is, the value of a dollar at the end of a certain period is four times as great, and when your interest rate has increased three times, the value of your money has increased sixteen times. Everybody in this room is familiar with compound interest tables and other logarithmic tables, but unless you have a chart of that sort before you, you do not appreciate the great difference of getting a good return on your money or a small return, and it is my contention that people sacrifice a good deal more on their income for the sake of marketability and safety than the safety or marketability is worth, and I am going to try to demonstrate that to you before I get through with this lecture.

Incidentally, I think that our company sections ought to be aimed not only to teach the technic of our business, but to broaden a man's scope of knowledge in a general way, and especially as to those things which are important in making that man a business man, and those things which make him the best qualified to carry on corporate work, because, after all, the safety of our investment, our stock investment, depends upon preserving the life of that corporation from attack, and being able to finance it and raise money and things of that sort. I maintain that when a man has to invest his money at two or four per cent, the return he gets on it is so small that it does not encourage him, it does not give him keen encouragement to become a saver, while, if you make a higher rate of return, six, seven or seven and one-half per cent, after he has had a taste of saving money, he not only learns to save, but he learns to be a shrewd investor. You know if I were to try to tell you what I thought was the secret of success of some of the big fortunes in this country, I would have to tell you that I could not see any reason for it, except it is the desire to accumulate money, that it was the determination to accumulate that brought about the success rather than any ability, rather than any knowledge. Now, you will know that if a man could, during the period of his working life—and assume that you extend that working life to the ten years when he

is in retirement, if you assume that he seeks a seven and one-half per cent investment, and is able to get away with it and have safety, he is able to make his money grow—make every dollar grow to forty-one dollars and seven cents, as against making it grow to two dollars and seventy-one cents or seven dollars and thirty-two cents if he would confine himself to a two per cent investment or a four per cent investment.

Now look at the chart on page 99.

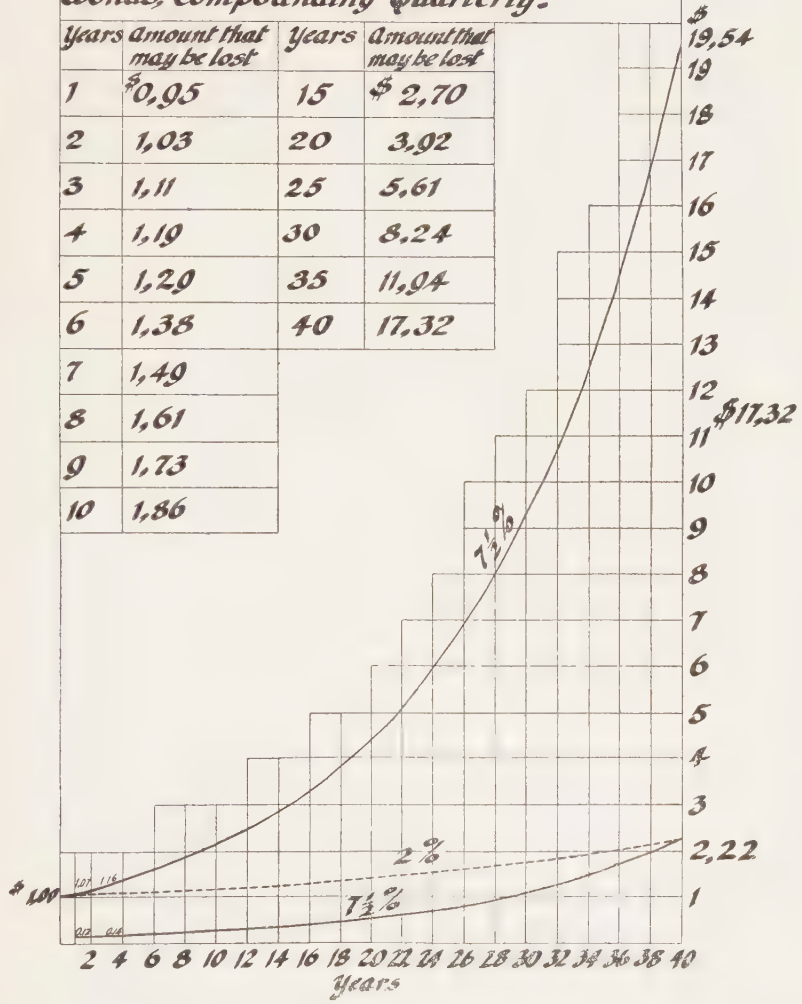
Here is a table that shows you the value of one dollar invested at two per cent or at seven and one-half per cent; and here is a table showing what you can lose by the end of the specified year, provided you have had no loss prior to that time, and provided you have no loss subsequent to that time over a period of forty years. If you have no loss subsequent to the first year, you could, at the end of the first year, lose ninety-five per cent of your original dollar, and the balance of it would be sufficient to earn you as much money as though you had invested the whole of it in a two per cent government bond, and had no loss whatever.

At the end of the second year, you could stand a loss of one dollar and five cents, and at the end of the fourth year one dollar and eleven cents, at the end of twenty years, three dollars and ninety-two cents, at the end of thirty years eight dollars and twenty-four cents, and at the end of forty years, seventeen dollars and thirty-two cents. You could lose that and you would be no worse off than if you invested originally in a two per cent government bond. That is to say, the end of the fortieth year you could lose seventeen dollars, and have every dollar you originally put in and still have as much as you would have had in investing in two per cent government bonds.

On page 100 the same thing is worked out on a four per cent basis, intended to represent a municipal bond. Now the question comes down to this, whether a man is warranted in taking the chance on the higher rates of return. We believe that safety of investment depends primarily on discrimination. That is, in choos ing an investment the principal thing is discrimination. If an investor is not in a position to discriminate keenly, the next thing to do is to choose the class of securities that are reasonably safe, and then secure the average of all, by diversifying his invest-

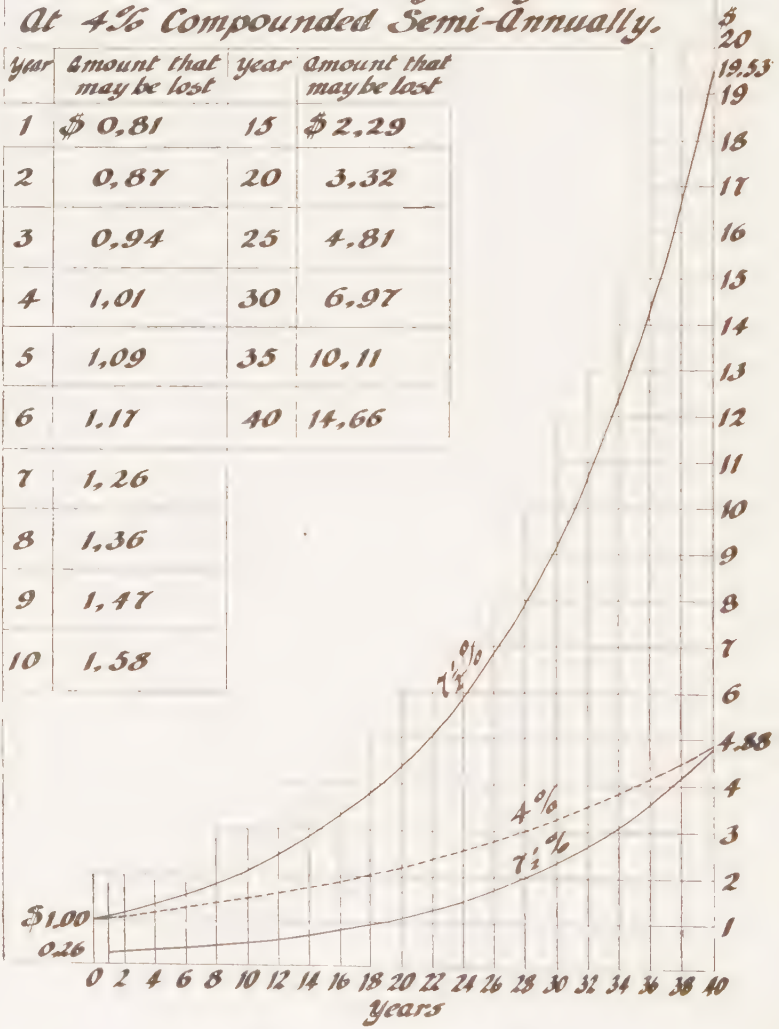
If One Dollar is Invested at 7½% Compounded Quarterly, This Table Shows The Amount That Can Be Lost at the End of Any Particular Year And Still Yield the Same Result at the End of a Forty Year Period as if it had Been Originally Invested in 2% Goverment Bonds, Compounding Quarterly.

Years	Amount that may be lost	Years	Amount that may be lost
1	$0,95	15	$ 2,70
2	1,03	20	3,92
3	1,11	25	5,61
4	1,19	30	8,24
5	1,29	35	11,94
6	1,38	40	17,32
7	1,49		
8	1,61		
9	1,73		
10	1,86		



If One Dollar is Invested at 7½% Compounded Quarterly, This Table Shows The Amount that Can be Lost at the End of Any Particular Year and Still Yield the Same Result at the End of a Forty Year Period As if it Had Been Originally Invested At 4% Compounded Semi-Annually.

year	Amount that may be lost	year	Amount that may be lost
1	$ 0,81	15	$ 2,29
2	0,87	20	3,32
3	0,94	25	4,81
4	1,01	30	6,97
5	1,09	35	10,11
6	1,17	40	14,66
7	1,26		
8	1,36		
9	1,47		
10	1,58		



ment. We have worked out in our office a great many interesting statistics on different classes of business. Here is something that may interest you—probably will interest you. Several years ago, we attempted to determine the losses which had been experienced in gas bonds—bonds on gas companies—and we made a very earnest search for the various losses that had been experienced, but were never able to get a statement that we were willing to put out over our signatures, saying that this represents all the losses that have been had on gas bonds, and there are no others. But I am quite sure that we had that record substantially right, although it was not one we were willing to put ourselves on record with.

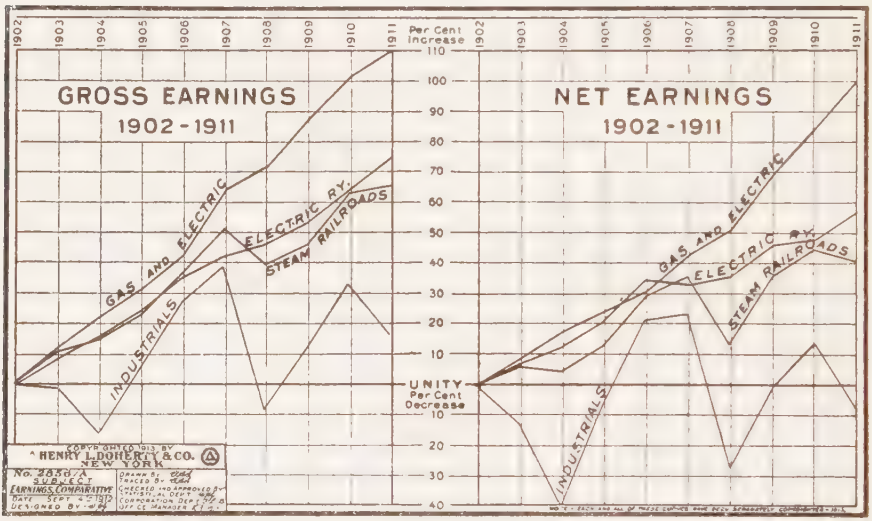
We are now trying to gather those same figures again, and this time I think we will get them so complete, and will go to so much trouble to get them, that we won't be afraid that anybody can successfully challenge the fact that there has been any loss that we have not a record of, and that will not be compiled in the figures we present. But the figures I made up at that time, undoubtedly showed this, that the losses on gas bonds for the proceeding forty years had been less per thousand dollars of bonds outstanding than the losses that have been on National Bank deposits. I think the figures show that losses on National Bank deposits had been about seventy cents per every one thousand dollars deposited, and the loss on gas bonds had been something like twenty-five cents on every one thousand dollars of outstanding bonds. Imagine a man deluding himself with the belief that his money was safe in a National Bank, where he was getting no interest, or two or three or four per cent at the most, while he might have had a gas bond which he might have bought at a price which would have yielded him a six, or possibly even a seven, per cent return. Not only that, but when a man experiences a loss with a bank, it is very apt to be an entire loss, while it is never possible to have an entire loss on a first mortgage bond on certain classes of property. So in addition to the direct figures, as they work out, he had the opportunity in one case of having a complete loss of everything he had, while in the other case, at most, he would get a shrinkage.

We are working out some figures, now, in our office to show the losses which have been experienced in various lines of wealth, and I do not think I will premature the publication of our figures

when I tell you the number of steam railroads that went into the hands of a receiver every year averaging over a number of years is ten times as many as electric light plants. Not only that, but practically ninety per cent of all the steam railroads that went into the hands of receivers, go to receivers' sales, while only about one-half or fifty per cent of the electric light plants that go into the hands of a receiver go to a receivers' sale.

Now look at the chart below.

Here is a chart showing the gross earnings of certain very general classifications of business. The first line there shows the



gross earnings of gas and electric companies. You notice how that goes up. The next line shows the gross earnings of steam railroads. The next line shows the gross earnings of electric railroads. The next line shows gross earnings of industrials.

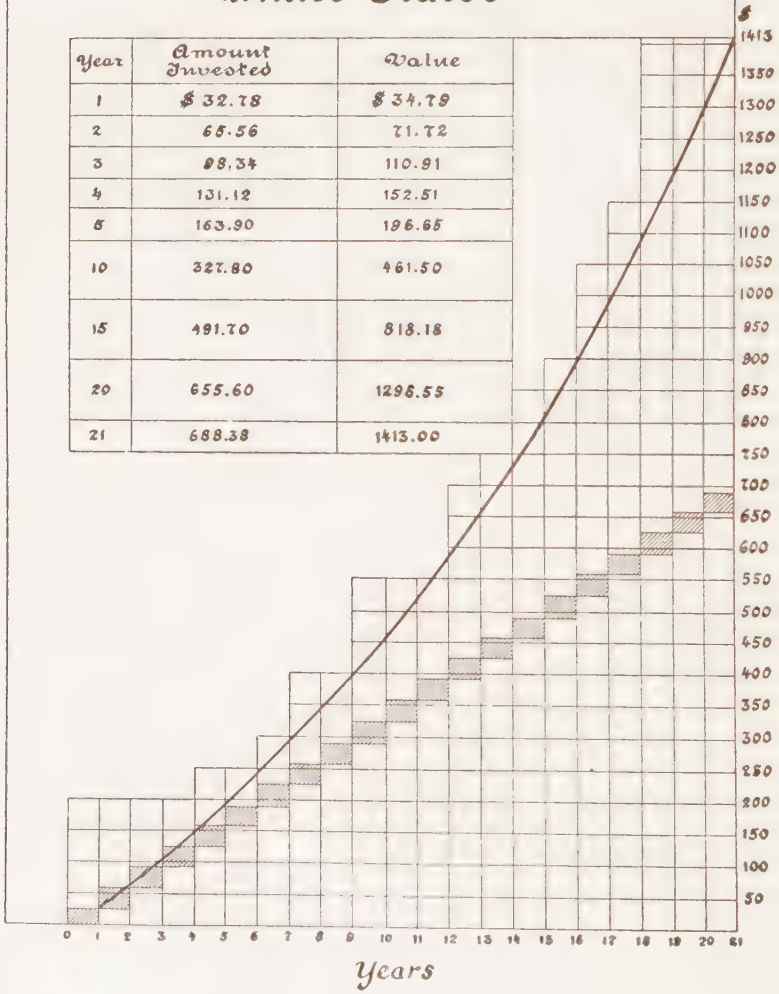
Now here are the net earnings—here are gas and electric companies. Here is the electric railway company. Here are the steam railroad companies, and here are the industrials. That chart tells its own story in a way. It tells you that there is no class of business that is so stable as the gas and electric business. There is a reason for that—it is just exactly what we would expect to find. In the first place, in the gas and electric business, we are furnishing something that is used right along, practically, the same in good times and bad times.

Not only that, but our price is fixed. We sell at same rates during periods of depression as we sell during periods of prosperity. Other lines of business, like the steel business, increase their prices when a big demand comes. We keep our prices the same. When periods of prosperity come, we have to pay more for our coal, we have to pay more for all of our materials, and having a fixed selling price, that tends to keep our earnings down from what they otherwise would be in times of prosperity, but when the period of depression comes along, we still maintain that same selling price, while we are able to buy all our materials at a much lower price. The tendency is for the gas and electric companies to go along with about constant earnings during times of depression or during times of prosperity, but due to the growth of the city and the continually new uses found for gas and electricity, you have a general upward tendency. Just now, and for many years back, the safest investment that could possibly be made has been gas and electric securities. The general classification of public utilities has been better than any other general classification, but gas and electric companies have been the best of all. That is in contradistinction to the street railway companies and other public utility companies.

Now it is rather interesting to note that a gas or electric bond is not as yet in popular demand by the public. You can go out and sell a railroad bond on four per cent basis, where it might keep you busy selling an electric light bond on a six per cent basis. Securties go more or less by fashion, when people do things just because a lot of other people are doing them. Just now the steam railroad security is in vogue, but the record made by the steam railroads, especially during the last few years, is not one that is going to keep that class of securities in vogue, and the class of securities, I believe, that will come next in vogue will be the gas and electric securities. You hear a great deal about manipulation of stock. Well there is such a thing as manipulation, but that is not what the public calls manipulation. It is generally anticipation. For instance, take it in cotton, as a good example. The whole western part of the state of Texas, that enormous area produces a cotton crop about once in three years. The whole gamble in cotton depends on whether western Texas is going to produce a cotton crop or not. Every cotton dealer, every cotton house, has a local representative stationed down there to telegraph up when

If at Birth and Each Year Thereafter $32.78 were Invested at 6% Compounded Quarterly, The Amount at the End of 21 Years Would Equal the Average Per Capita Wealth of the United States

Year	Amount Invested	Value
1	$ 32.78	$ 34.79
2	65.56	71.72
3	98.34	110.91
4	131.12	152.51
5	163.90	196.65
10	327.80	461.50
15	491.70	818.18
20	655.60	1298.55
21	688.38	1413.00

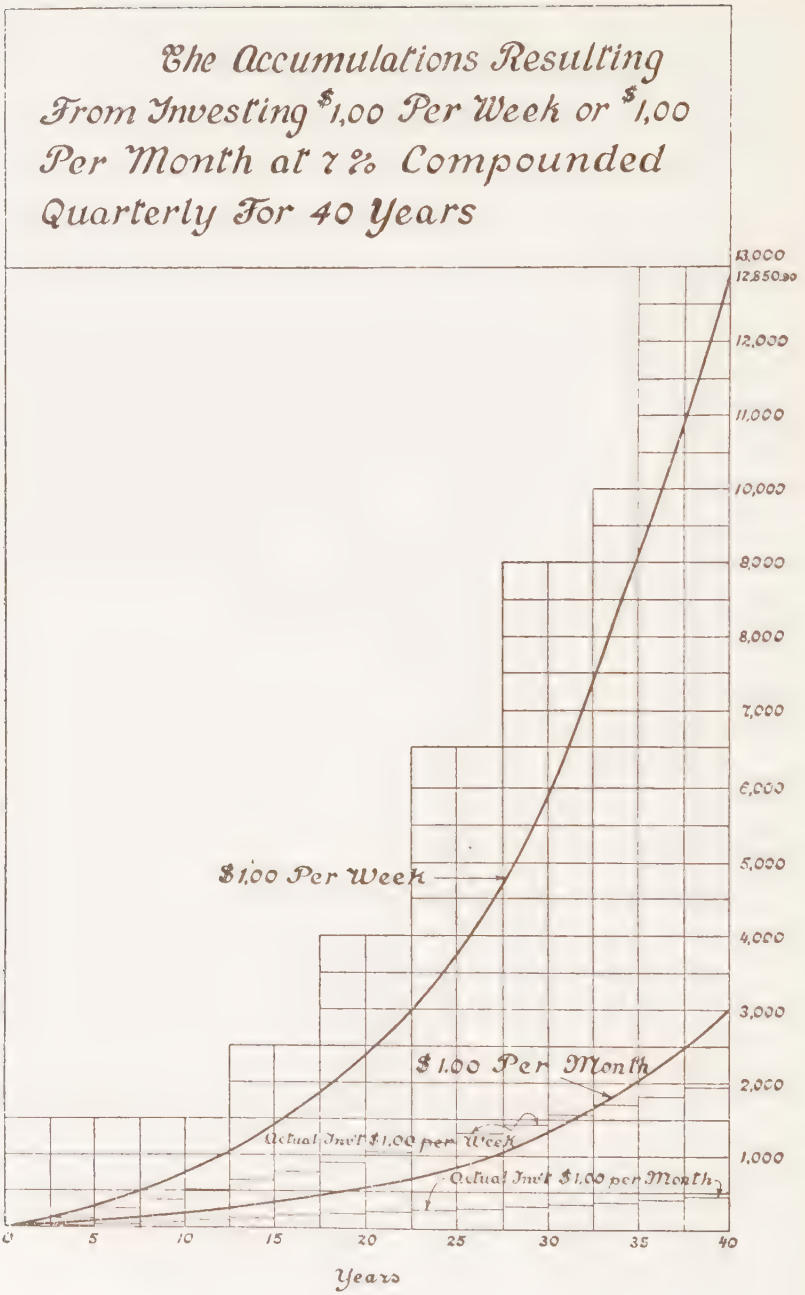


the barometer is up, or something like that, and they are sitting there with their ear to the ticker and their eyes on the tape, and they are not so much manipulating the market as they are anticipating conditions which are bound to happen. And when the ordinary man goes into the stock market or goes into the cotton market, or goes into any other market, he may win, but he will assay at least twenty per cent plain sucker, because he is trying to carry on the business of a lawyer or something of that sort and compete against a fellow who is carrying on just the business of stock anticipation. The kind of securities for the man to buy who has any other business is the kind he knows is good, that he can lock up in his safe and wait for an additional value, or that he is going to keep because it yields a satisfactory return. The average man has no business whatever dabbling with the other fellow's game, and that is what he is doing when he goes into the stock market without any reason for it or anything else. The thing to do is to make up your mind what class of securities you are going to buy, and then you are not going to care a darn where the market goes on those securities—you are going to hope it is going lower because then you can get more of them cheaper when you have more money to put into them. But then, eventually, you know it is worth so much, and you are going to get so much out of it.

I digressed from my usual argument just to give you an indication of the different lines of business, and what even a crude analysis will show. What I showed you on the board is a very crude analysis. We could take you and show you groups of different forms of industrials, those representing construction work, those representing large, very large interests, those representing food products, and things of that sort, and then you would get a very different illustration of that industrial group, which on the whole shows up so badly, and by the way, that industrial group takes in every industrial listed on the New York Stock Exchange in 1902. Those figures cover a period from 1902 until 1910.

You will note, as a whole, that industrials made a very bad showing, but on the other hand, there are some of those industrials that show just as well as that gas and electric. That means that the balance of them show just that much worse.

Look at the chart on page 104 and study it carefully.


The Accumulations Resulting From Investing $1,00 Per Week or $1,00 Per Month at 7% Compounded Quarterly For 40 Years
13,000
12,850.90
12,000
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
$1.00 Per Week
$1.00 Per Month
Actual Invt $1.00 per Week
Actual Invt $1.00 per Month
0
5
10
15
20
25
30
35
40
Years

There is a chart for what it may be worth. It simply shows what you would have to do if you had a child born today and wanted to make that child a man of average wealth when he was twenty-one years old. If you were to invest thirty-two dollars and seventy-eight cents each year for a period of twenty-one years, that boy, when he became of age would be a man of average wealth. And we all know that the big fortunes of today were not won by a man who started out with somebody giving him the average wealth of the country. As a rule, he started on nothing; and he got it by shrewd investments.

Now, look at the chart on page 106.

Here is a chart showing the result of investing one dollar a week and one dollar a month on the assumption that seven and one-half per cent could be earned. If a person would invest one dollar a week on that basis for a period of forty years, one dollar a month—it would become three thousand dollars at the end of a forty-year period. Investing one dollar a week, it would be twelve thousand, eight hundred and fifty dollars, or twelve thousand, eight hundred and eighty dollars.

One dollar a week don't sound like much, but you can see what it figures up.

There is a chart on page 108.

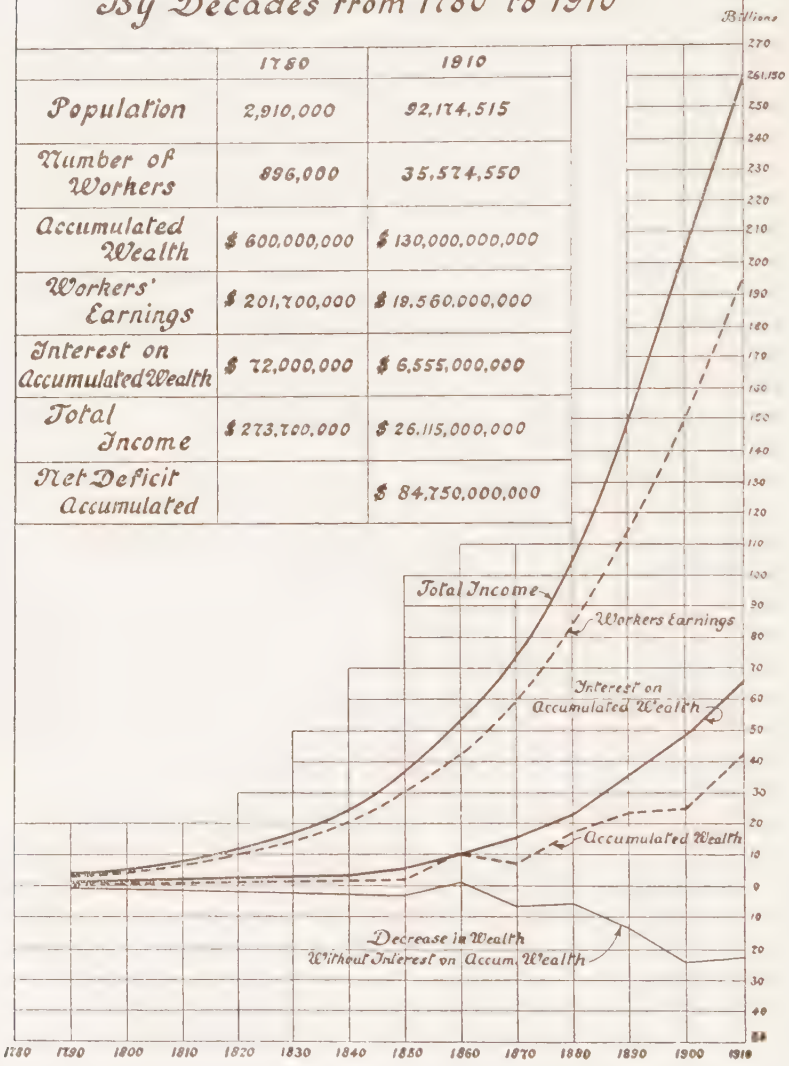
Now, I will just refer to this chart briefly. There is the summary of the accumulated wealth of the United States from the close of the War of Independence, showing the number of workers, accumulation of wealth, and a lot of interesting data that I won't go into tonight, but it is all part of this general analysis, and all part of this general argument, showing why we should be savers and investors, and why the average citizen should be a man who is not only a worker but a property renter.

Look at page 109.

There is an interesting curve, in a way, showing the accumulation of wealth. It is taken from that other chart I just showed, the larger chart. This shows the accumulation of wealth in the United States. It started in at the close of the war of the rebellion at six hundred million dollars, and has climbed to one hundred and thirty billion dollars. We have tried to compute—we have tried to determine the prevailing rate of interest at different periods of time. In the early days of this country, it was nothing for people to pay eighteen per cent interest per annum—

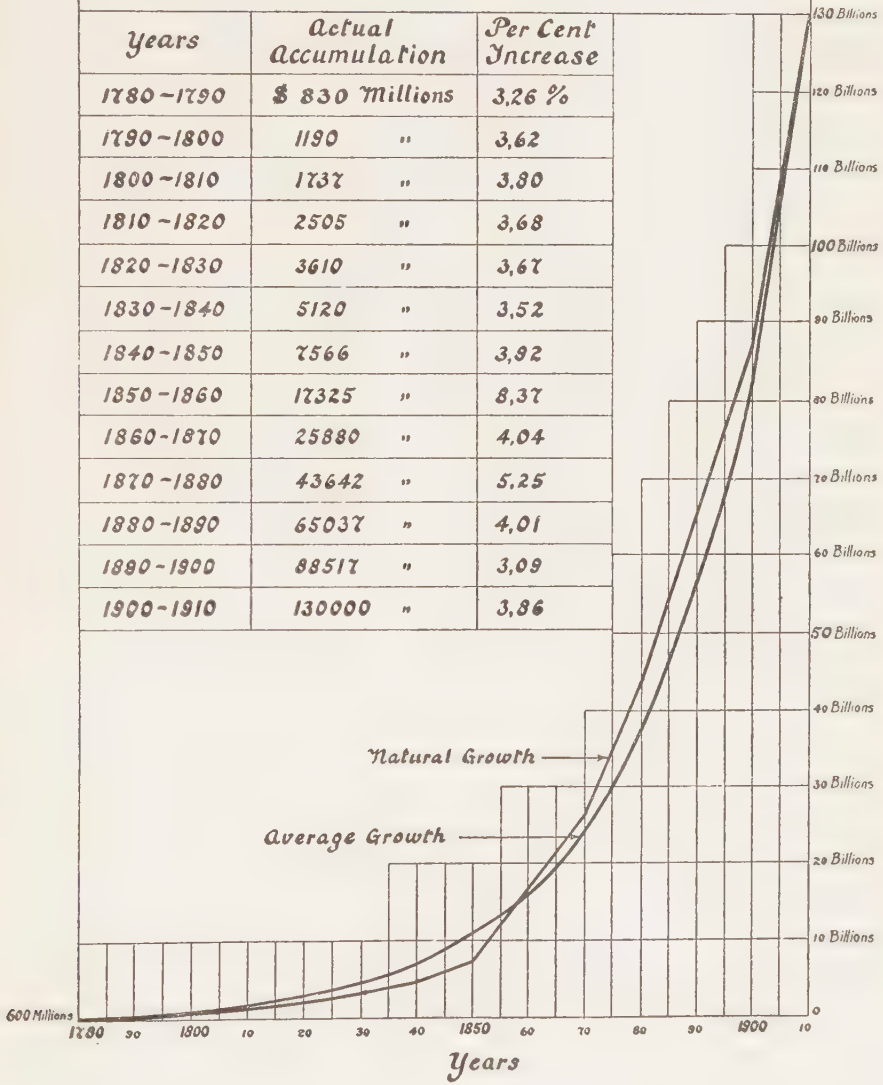
Workers' Earnings, Interest on Capital, Total Income, Accumulated Wealth, and Net Decrease in Wealth were it not for Interest on Capital By Decades from 1780 to 1910

	1780	1910
Population	2,910,000	92,174,515
Number of Workers	896,000	35,574,550
Accumulated Wealth	$ 600,000,000	$ 130,000,000,000
Workers' Earnings	$ 201,700,000	$ 18,560,000,000
Interest on Accumulated Wealth	$ 72,000,000	$ 6,555,000,000
Total Income	$ 273,700,000	$ 26,115,000,000
Net Deficit Accumulated		$ 84,750,000,000



The Accumulation of Wealth in The United States From 1780 to 1910 by Decades

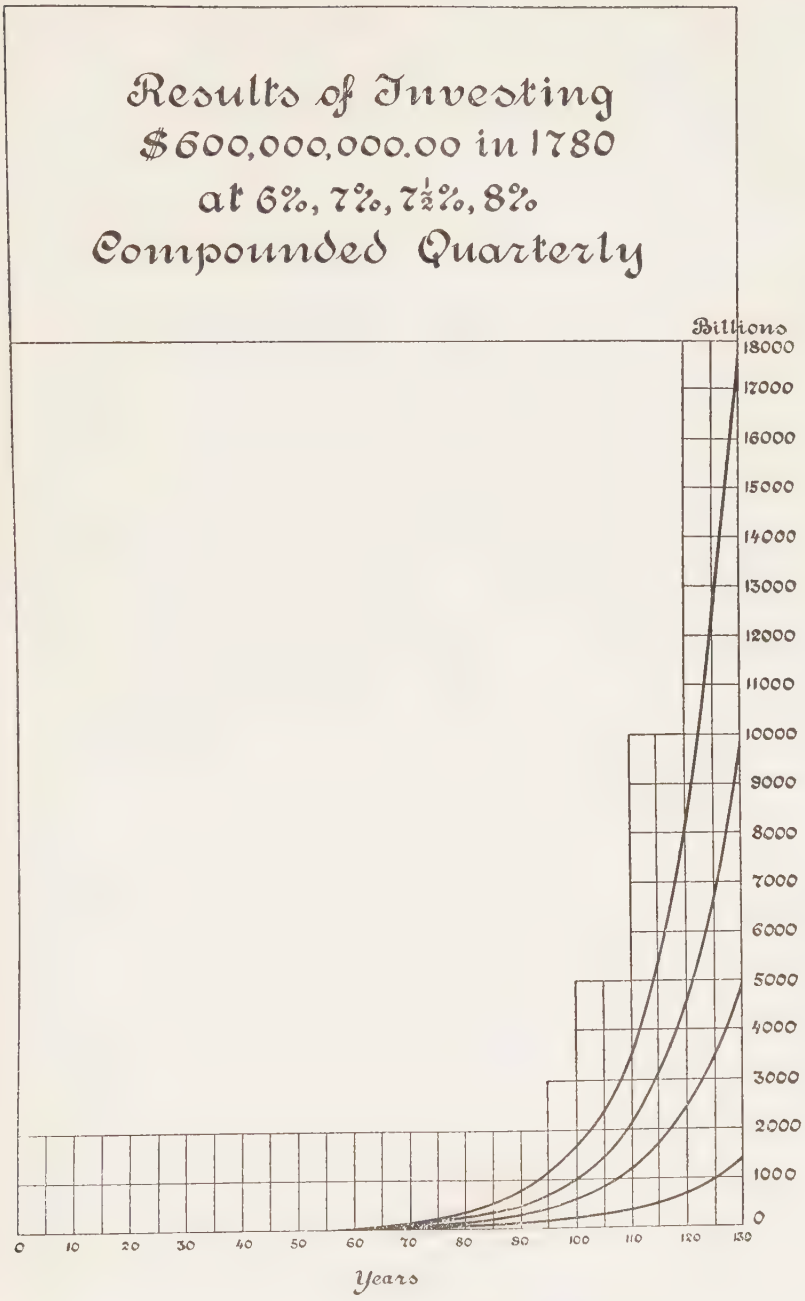
Years	Actual Accumulation	Per Cent Increase
1780–1790	$ 830 Millions	3,26 %
1790–1800	1190 "	3,62
1800–1810	1737 "	3,80
1810–1820	2505 "	3,68
1820–1830	3610 "	3,67
1830–1840	5120 "	3,52
1840–1850	7566 "	3,92
1850–1860	17325 "	8,37
1860–1870	25880 "	4,04
1870–1880	43642 "	5,25
1880–1890	65037 "	4,01
1890–1900	88517 "	3,09
1900–1910	130000 "	3,86



twelve per cent was regarded as low. It is still customary in certain western states to assume that nothing less than eight per cent is the legal rate. For instance, take it in two of the states where I operated a power plant—the banks do not think of lending any money at less than eight per cent. Take in Joplin, Mo., which is not very far west, and is a very prosperous mining and agricultural section and a thoroughly civilized place in every way, eight per cent is the prevailing rate of interest in that district. It is interesting to know that the increase of wealth—this does not mean the return of the wealth, but the actual increase of wealth—proceeded at those rates. That is, for that decade, it decreased, at the rate of 3.36 per cent, the highest rate being 8.37 between 1950 and 1860, which is the decade just previous to the Civil War.

Let us look at the chart on page 111.

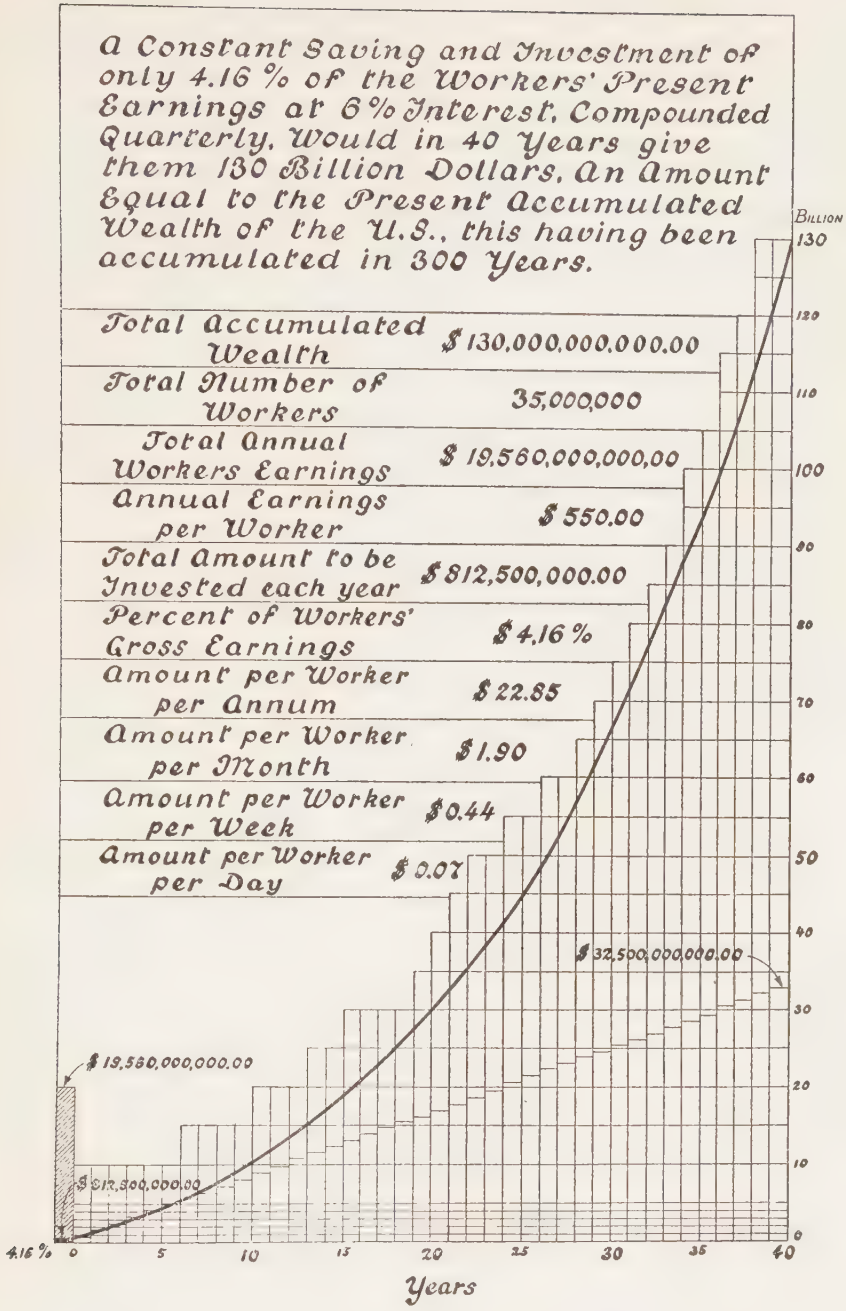
There is a chart that shows the workers' earnings, the total income,—the total income being made up from workers' earnings and the rent of property. This curve down here is deduced from the expenditures as against this curve of earnings from labor. In other words, this country has expended more money than it has earned from labor. It is behind the game to the tune of apparently some twenty-two billion dollars. I think fifty-two billion is more nearly correct, but the entire wealth of this country in a way is due to reinventorying. That is, when you consider that we have only actually accumulated one hundred and thirty billion dollars of wealth, and if you would compute against that, at present value, the amount of forests that we have devastated, the mines we have depreciated, and the lands we have exhausted, you will find out that we have less wealth than we had to start on. But our wealth is due to reinventorying and nothing else. That is, it is due to appreciations in value. We have simply showed this accumulation of wealth to reinventorying. In fact, extravagance is a characteristic feature of the American people—all classes. It makes no difference what class you go to, they are all characterized by extravagance. The people of the United States spend two hundred and sixty dollars per capita on destructive consumption. That is, it costs them two hundred and sixty dollars per capita to live without accumulating anything. The people of France spend one hundred and twenty dollars, and some countries spend as low as—some thoroughly civilized countries spend as low as eighty-six dollars.


Results of Investing
$600,000,000.00 in 1780
at 6%, 7%, 7½%, 8%
Compounded Quarterly
Billions
18000
17000
16000
15000
14000
13000
12000
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0 10 20 30 40 50 60 70 80 90 100 110 120 130
Years

There is a general belief that it costs less to live abroad than it does to live here. In fact, all foodstuffs in all European countries are higher than they are in America, and the principal outlay for the poorer people is foodstuffs, yet you take the average French farmer, or the average laborer, spending probably less than the average, and a great deal less than the average of one hundred and twenty dollars per capita per year, and he, apparently, lives very much better than our average American in the same station of life, simply because our American does not know how to spend his money. If we teach them the value of money, we are going to teach them how to spend money. Not only that, but a good part of the American extravagance is not a matter of pleasure, but a matter of rivalry, and there is a world of difference. You know the Indians used to get together and try to out-rival each other by showing each other how much torture they could stand, and they do it yet, I guess. A great deal of the expenditures of the American people are prompted by the same sort of a pride that caused the Indians to get together and subject themselves to torture, and that is one reason why we must appeal to our American people in groups. I can only say that the American people as a whole are unwarrantedly extravagant, no matter by what measure they are adjudged. Any true measure will show them to be unwarrantedly extravagant.

Let us look at page 113.

Here is the most interesting chart of all. According to all the statistics that we can gather, the accumulated wealth of this country is one hundred and thirty billion dollars. That is the accumulated wealth, private and public, owned by the government and by the private citizens—one hundred and thirty billion dollars is so much it is pretty hard to measure unless you chop it up into some kind of units that we can comprehend. I am going to chop that up into units that we can comprehend. In the first place, it amounts to fourteen hundred and thirteen dollars per capita—equivalent to every man, woman and child in the country having fourteen hundred and thirteen dollars. We have thirty-five million wage-earners in this country—that is, we have thirty-five million workers. We have not thirty-five million wage-earners, because in some cases the worker does not get a wage—he may be the son of a farmer, not getting a wage, but still be a worker. There is paid in wages nineteen billion


A Constant Saving and Investment of only 4.16 % of the Workers' Present Earnings at 6% Interest, Compounded Quarterly, Would in 40 Years give them 130 Billion Dollars, An Amount Equal to the Present Accumulated Wealth of the U.S., this having been accumulated in 300 Years.
Total Accumulated Wealth $130,000,000,000.00
Total Number of Workers 35,000,000
Total Annual Workers Earnings $19,560,000,000.00
Annual Earnings per Worker $550.00
Total Amount to be Invested each year $812,500,000.00
Percent of Workers' Gross Earnings $4.16%
Amount per Worker per Annum $22.85
Amount per Worker per Month $1.90
Amount per Worker per Week $0.44
Amount per Worker per Day $0.07
Billion
130
120
110
100
90
80
70
60
50
40
30
20
10
0
$32,500,000,000.00
$19,560,000,000.00
$812,500,000.00
4.16%
0
5
10
15
20
25
30
35
40
Years

five hundred million a year. If wage-earners of this country could be induced to save and invest 4.16 per cent of their annual wages, they could in forty years accumulate as much as had been accumulated in the three hundred and five years of settlement of this country. This one hundred and thirty billion dollars has been accumulated since the settlement of this country, which, for the purposes of this calculation, I have dated Jamestown Settlement, which occurred in 1607. In three hundred and five years, we have accumulated one hundred and thirty billion dollars. If your wage-earners of this country were to invest at six per cent 4.16 per cent of their wages, or an average of twenty-two dollars and eighty-five cents a year, one dollar and ninety cents a month, forty-four cents a week, or seven cents a day, they could in forty years accumulate an amount of wealth equal to the

> First of all, you may find that he is a good-natured fool whom people like; he has the faculty of making friends and keeping them. If he is conceited, his conceit does not take the form of trying to drag men down, so he can appear big in comparison.
>
> —HENRY L. DOHERTY

entire accumulated wealth of the country after three hundred and five years.

We, universally, all classes of people, have allowed everybody to think there was a great accumulation of wealth that was weighing everybody down, and apparently nobody seemed to know that when you measure the man of wealth by any sort of true standard, it was comparatively nothing. That is, you could almost neglect the one hundred and thirty billion dollars and say, "let's all start today afresh." We will just simply say that isn't any handicap but what we can forget, because it amounts to very little. Our annual wages amount to nineteen billion five hundred million. Our rent on property, or the return from that wealth probably amounts to seven billion eight hundred million, a total, we will say, of twenty-seven billion dollars. Now, we are accumulating wealth right now at the rate of about four billion dollars a year, so we spend each year for destructive consumption about twenty-three billion dollars. If we were to con-

tinue to live at our present pace and cease to produce, we have in three hundred and five years only saved enough money to take care of us for six years. In three hundred and five years we are only six years ahead of our present rate of living.

Measuring this by another standard, if a family had come to America at the time Jamestown was settled, and had had sixteen hundred and forty-eight dollars and some odd cents and had kept that money employed ever since at six per cent, compounding it quarterly, that one family alone would have an accumulation of wealth equal to the entire accumulated wealth of the entire country. Or, if one family had come to this country at the time the Jamestown settlement and had invested one hundred and ten dollars every year, or less than thirty cents per day, and kept that money continually employed at six per

> When you see some man whom you regard as a "dub," but who, nevertheless, has made a business success—and there are many such—it is a good thing to study whether he hasn't certain characteristics which you lack.
>
> —HENRY L. DOHERTY.

cent, that family would have an accumulation of wealth equal to the entire accumulated wealth of the entire country.

In other words, the whole country has gone crazy and has gone socially crazy, in a sense, in the belief that there has been a great accumulation of wealth. Now there has been a great accumulation of wealth in another form than that which I have shown you here, and it is an accumulation of wealth which I would term civil wealth or social wealth, and that is the knowledge that we have gained that gives to each man the ability to purchase things at less than they are worth, if their worth is stated in the original method of procuring them. Let us take for instance the manner of making a fire. The first method of making a fire was the friction method. Undoubtedly it took no less than twenty minutes of the hardest labor, and then you had a fire. Along came some genius and he got up the improved method where you had a bow, and you could spin one wooden peg on a board. Then along came another improvement—the

flint and tinder box, and then came the match, and the match has stayed with us ever since. And now, our wage-earner of the poorest type can work, we will say, for twenty minutes, earn five cents, go down to John Wanamaker's and buy one thousand matches for five cents. He can buy one thousand fires for the product of twenty minutes' work. But there was a time, when it took twenty minutes' work to get a fire. In a rough way, you could capitalize all of these various improvements—I have just mentioned one, that of matches—you could capitalize all of these various improvements, and you could probably show that at the least calculation that thing which I term social wealth is simply an enormous thing compared to that punny accumulation of wealth when measured by any sort of true standard.

There is another and better reason why every man should be

> I believe honesty is the best policy in spite of the fact that I see many honest men who have not succeeded. But for every honest man who fails there are ten crooks with brains and smooth tongues who if not behind bars are living a precarious life.
>
> —HENRY L. DOHERTY.

not only a worker, but a property renter, and that is this: the same example that I cited to you about matches holds true in other instances. Originally, when you wanted to have power, a man worked a tread-mill or a crank, or something like that. In fact, that was an improved method. Then the horse was substituted, and along came the fellow with steam invention and he substituted the steam engine, and then came the fellow who made electric transmission possible, and they commenced to substitute the flowing of the water, to take the place of the man with the crank. That thing is going on all the time. The telephone has largely displaced the messenger boy. You can go right on and show how we are substituting all the time machinery and power to do the work that men formerly did. We are even putting in the automatic vending machines. You have a restaurant here in Philadelphia with automatic vending machinery, to take the place of waiters. We are putting the automatic vending machine in to take the place of the clerk. That is going on all the time.

If we were to cease to develop the work of the country, there would no longer be labor enough to go around. That is another reason why it behooves every man during the period when we are building for the future, to accumulate his share of the rentable property. His building for the future is never stopped, but I can conceive of nothing that will so accelerate it as to bring about a widespread movement on the part of the wage-earner to become an investor, and to save his money and invest. He simply changes his expenditure from a destructive expenditure to a re-constructive expenditure. That is, when I bring out a bottle of champagne, and drink it, or buy a cigar and smoke it, it is gone, but when I take the price of a cigar and add it to the price of a lot of other cigars and build a steam railroad through a part of the country that today can raise nothing but cattle, because

> Talented people make a great success early in life and then are apt to have a bitter time of it in their declining years when the real worker is reaping the harvest of satisfaction which is the reward of honest work.
>
> —HENRY L. DOHERTY.

every bit of stuff raised in that country must come out by its own locomotion, and when I make that a wheat producing country, or make that land more valuable by making it possible to produce crops, instead of destroying wealth, I have spent my money, but I have created still greater wealth. It is reproductive and goes on and on, and the profits of that line can again produce another railroad. So, gentlemen, I am advocating for these reasons which I have stated and many others, an attempt on the part of all of us to try to make the salaried man and the wage-earner an investor. I am working at four examples—I have the ambition to get the employers of labor together in this country, and I am then going to convince them that they must make the same effort with their own men. I am going to the bankers of this country, to try to get them to issue securities and make them available for the small investor, and before I get through, I fully expect to start a movement along this line that is nation wide.

An article on "Welfare Work" was written by Mr. Doherty in 1912, showing the application in a practical way of the ideas formulated by him regarding thrift.

OT a few of the leading thinkers and social workers of the country are today giving patient and effective study to the vexing problems of the relations between capital and labor.

Closely linked with this are those questions which relate to the standards of living, the high costs of the necessities of life and the growing tendencies to private and public extravagance.

Slowly but steadily there is developing from this analysis of conditions a growing public consciousness that capital and labor are co-workers, each dependent on the other. The old idea that capital hires at its own price and that labor must be satisfied with what it can get is giving way to the new conviction that the employe should have some share in the profits realized from the joint activities—something more than the daily wages or monthly salary stipulated as the measure of his service value.

The "welfare movement" for the betterment of conditions among large communities of wage earners, as exemplified in some of the larger industrial establishments, indicates that more and more attention is being constantly given under wise direction to this study of industrial methods—of evils and their remedies—and that this must lead to continually improving systems and conditions.

We have come to realize very generally that these serious and vital questions can best be answered when we find the common ground on which both capital and labor may get together—when there is established a mutual confidence between master and men, a settled and sincere conviction that the prosperity of both is based on that inter-dependence which each must cordially and cheerfully recognize.

Various profit sharing systems have been evolved from the brains of thoughtful and brilliant leaders in the industrial field but, for many large establishments, there is still serious question as to how there can be inaugurated a profit sharing plan whose benefits to employes will outweigh the harm and mischief to which it gives birth. The conditions, circumstances and charac-

ter of great business enterprises are so diverse as to make uniformity of method an impossibility even though unity of purpose may be attained.

For many establishments the question of profit sharing method or plan becomes a very baffling one.

It is interesting to note how the manufacturers of incandescent electric lamps, who are comprised in the National Electric Lamp Association, have worked out their own theory of effective cooperation in all the departments of their great business.

While ridding themselves of a ruinous price competition they have succeeded in constantly lowering the price of their product to consumers, to a point where electric light can now be had at an approximate cost of one watt of electric current for one candle power of light delivered, as compared with a cost four times greater at the time their association was organized.

This has been accomplished in the face of constantly increasing costs for materials and labor. It has been made possible through cooperative effort—improved systems of computing costs—competitive quality tests and comparisons—stimulation of inventive genius within the ranks of its own workers and generally improved manufacturing, administrative and commercial methods.

Prior to the formation of this association most of the companies had been doing business at no profit. Now they all show satisfactory earnings.

Since the association was formed no capital has been impaired and no company thus associated has been subject to receivership or other liquidation.

The association through its member companies maintains manufacturing, engineering and sales organizations comprising many separate factories and employing thousands of persons.

The gross business of the member companies aggregates about ten million dollars per year.

Throughout the electrical world this association is known for its progressive and cooperative spirit. It is not surprising, therefore, that it should have evolved a scheme of profit sharing investment for its employees which is at once simple, effective and unique.

Its experience in the cash distribution of a liberal, profit sharing fund showed that its employes *spent* this money instead

of saving and investing it. For the most part the employes were no better off than before. In some cases their financial condition was actually worse because they had contracted extravagant and wasteful habits through the use of this money.

It was also observed that those who wished to save and invest their money were mostly quite incapable of doing it successfully because of entire lack of knowledge and experience in the selection of investment opportunities. It was felt that the small investor, ignorant as to securities and their values, not trained to select safe investments from the long list of good and bad ones, had so little chance of making a wise choice that he might as well spend his income, as to try to save it and then have it vanish—principal and interest—entirely out of sight.

Careful study and inquiry developed the fact that in the association itself the men who, in the management of their personal affairs, had practiced economy, thrift, saving and prudent investment of savings, were the ones who could best be entrusted with association responsibilities.

While individuality is an important factor in promoting thrift it is equally true that thrift once established and made habitual is a potent factor in developing individuality.

An organization composed of men of thrift and enterprise is perforce a thrifty and enterprising organization.

It was logical and inevitable therefore that men of thrift, experience and financial sense should compose the committee named to formulate an association plan for the investment of the funds of the members.

The carefully worked out plan finally adopted has so commended itself to the officers of the member companies of the National association that they have most heartily and enthusiastically supported it by their personal subscriptions and have urged all of their employes and associates to avail themselves of the investment opportunities thereby afforded.

The fact is generally recognized that the small investor ordinarily is not in a position to invest money to best advantage either as to rate of return or as to security.

Success in securing investments that will be safe and at the same time will yield liberal income, surely will prove an incentive to thrift and saving.

Following the committee's investigations and recommendations two cooperative investment companies were formed in which all of the members of the association, their employes, and immediate families, could participate—become stockholders.

Long association with and intimate knowledge of the electric lighting business of the country had convinced these men of the financial stability and steady earning power of companies providing such service in growing cities. Naturally this suggested itself as an attractive field for investment.

Two companies have been incorporated and are now in successful operation. Taking the initial letters of the words forming the name National Electric Lamp Association, the word "Nela" was coined and is used to distinguish the two companies —one known as the "Nela-Alpha Investing Company"—the other

> Salaries and wages should be as cheap as peanuts if the boss placed the same value on the employee's working time as the employee places on his leisure time.
>
> —HENRY L. DOHERTY.

as the "Nela Alpha Anticipation Company." ("Alpha" the first letter of the Greek alphabet, signifies that the company is intended to be the first of a series.)

There is this difference between the two companies, viz.:

The first company, Nela-Alpha Investing Co., buys bonds and well-seasoned preferred stocks of gas and electric properties of established earning power,—conservative securities.

The second company, Nela-Alpha Anticipation Co., buys common stocks of going companies and invests in enterprises still in their formative or construction stages but having promise of unusually good profits from future earnings and enhancement in value.

In selecting securities for investment there are two ways of obtaining safety together with liberal income—one of these is by discriminating and the other by diversifying.

"All of the eggs are not placed in one basket." The bonds and preferred stocks purchased for the Investing Company are

not only carefully selected, known to be well secured and satisfactorily safeguarded—but the properties against which they are issued are in prosperous and growing communities widely scattered and all under constant and able management and supervision.

The benefits of distribution and average are, therefore, obtained and thereby also the company secures a higher rate of income on the money invested. In no other way can the small investor obtain these advantages of wide distribution or diversity, and experienced discrimination which are possible for the investment of funds in larger amounts. Here his money is a part of the common fund whose aggregate is large enough to command the best in the market at the lowest price.

> Only through the liberality of our laws permitting cooperation of capital by means of incorporation can the capital of the man of small means be put on par with the capital of the man of large means.
>
> —HENRY L. DOHERTY.

The advantage of this diversifying of investments is seen also in the experience of the Anticipation company whose operations are of a less conservative type but, on the other hand, give promise of large profits.

The assistance and advice of the Doherty organization is here most conspicuously valuable for opportunities are never lacking to finance and operate very profitable enterprises. At the same time this organization has the experience, mature judgment and engineering ability to select only the good things that are offered.

Par value of all shares in these companies is $10.00.

The Investing Company stock was sold in blocks.

Ten shares preferred and one share common at par for cash for $110.00.

The preferred stock is cumulative, pays six per cent per annum and no more, in monthly dividends, and is non-voting so long as dividends are paid. The common stock has the voting control of the company and gets all earnings after the

preferred dividends are paid, except that the fiscal agents receive for their services one-third of the net earnings remaining after six per cent has been earned and paid on both preferred and common stock.

The Anticipation Company was organized to give officers and employes opportunity for an investment carrying a somewhat greater risk with proportionate prospect of larger rate of income or increase in value. But no one is permitted to subscribe for Anticipation Company stock in an amount larger than that of his subscription for Investing Company stock.

The preferred stock of the Nela-Alpha Investing Company, paying monthly dividends, one-half of one per cent each—or at the rate of six per cent yearly—offers an exceedingly safe and

> Apparently the majority of the people assume that one who accumulates wealth takes it away from some one else. This is erroneous as he creates much more for others than he does for himself.
>
> —HENRY L. DOHERTY.

desirable investment for those who must have a better income yield than can be had from government or municipal bonds or on savings bank deposits.

There are many good reasons why a ready market and growing demand for this stock should be found among people of small means—as well as among larger investors. The original subscribers are entirely among the members of the lamp companies. These subscribers may be willing to sell some of their preferred stock, which always pays a six per cent dividend rate, but will hold their common stocks on which they expect to receive eventually very much larger profits.

Other Nela Companies in series will be organized from time to time, thus continuing for Nela employes the systematic habit of saving and investing. Knowing that they are to have these future opportunities for increased profits through their holdings of common stocks and that they can, with each new issue, secure preferred stock, to replace at same rate of interest (6 per cent) the preferred stock already owned, they will always be glad to

sell their friends and neighbors the preferred stock of the earlier companies in blocks as wanted.

As the par value of shares is only $10.00 each it becomes very easy for investors, who are not employes of member companies of the association to acquire preferred stock whenever any of it is for sale and thereby to secure a very safe and desirable security yielding six per cent.

Indeed, it is altogether probable that employes who own this stock will tell their friends and neighbors about it and, because of their own confidence in it, will want to have it held also by those who do not have similar opportunity to obtain safe investments at so liberal a rate.

This will make a constant demand and a steady market for the preferred stocks.

There is another very commendable feature of the plan as now developed—one that is so simple as to suggest the question why some one has not done it before—and yet is also so splendidly effective as to challenge the admiration of all who stop to think about it.

The monthly dividend checks to small holders of the preferred stocks, in many cases 50 cents each, per month, are easily spent and often wasted. To many it seems foolish and useless to try to save so small a sum and as to investing it the idea to them is absurd.

How can anyone invest fifty cents?

But a very beautiful and beneficent scheme has been put into effect to make these dividends *cumulative* and so to compound at 6 per cent per annum the interest earnings on the original sum invested.

This is acomplished by having the stockholder *assign his dividends* to the fiscal agents. More than one-half of the present holders of preferred stock of the Nela Investing Company have already adopted this plan so that several hundred dollars of dividends are in this way available *each month for reinvestment.* With this money, preferred stock of the company is purchased, at par or less, for the joint account of those stockholders who contribute their dividends to this cumulative fund. Each of them is credited each month with his pro rata share of dividends on stock held in this fund and when his credit has reached a sufficient sum to pay for one share of preferred stock, a certifi-

cate for one share is transferred to his name and sent to him. A little study of interest tables, showing how rapidly money will accumulate at six per cent per annum compounded monthly, will indicate why this plan is so favorably regarded and so generally adopted by the Nela Company members.

The marketability—or ready convertibility of a security—is one of the elements of value regarded as essential by many experienced investors. Able financiers are accustomed to advise the acceptance *of a low rate income* for the sake of obtaining also this feature of quick convertibility—that is, getting a security that *can be quickly sold* whenever the owner wishes to turn it into cash.

Many bonds and preferred stocks that are well secured, on properties showing favorable profits on capital invested, are not of the class that are quickly convertible, do not always have a ready market and therefore sell at comparatively low prices and carry a higher rate of interest. This is true of bonds and stocks on properties in small cities and towns—properties such as water companies, street railway, gas and electric light companies, whose owners are usually local capitalists and bankers interested in the development of the community in which they live, confident as to the present and future value of the properties and willing, because of this confidence and of their public spirit, to invest their personal funds in these enterprises. Usually there is no market for such securities outside of the local community—no demand is or can be created which will enable a holder of such securities to sell them, in an emergency requiring that he raise a certain amount of cash quickly.

The more modern method, however, of grouping a number of such properties into one holding company under one efficient operating and supervising organization contributes to the stability and growth of each property—to economy of maintenance, operation and administration—and to that diversity and distribution of risks, both usual and unusual, which give added strength and value to each property.

The securities of the holding company are given a broad and active market in that they are not only known and owned by investors in all of the communities where the operating properties are located but through published statements of earn-

ings, regular payments of interest and dividends and steady growth of surplus they gradually are brought to the attention of increasing numbers of investors in various financial centers, thus developing a widespread demand which creates a firm and active market.

The Nela Investing Company is in a position to avail itself of just such an opportunity.

It has the funds in hand, and coming in from month to month, by payments from stockholders, with which to purchase these thoroughly sound and safe, but not always quickly marketable securities.

Careful discrimination in selection, through the assistance of the fiscal agents, results not only in a liberal average rate of income but also in a reasonable enhancement in value; because with increase of population in any given community and growth of income to the public utility company serving that community, there is established a higher market value for the bonds and stocks of that company.

Therefore the earnings of the Nela Investing Company will safely provide the cumulative six per cent rate on the preferred stock and doubtless better than six per cent on the common stock. In fact, the stockholders feel so well assured of the very large success of the company—based on reports of results already accomplished—that none of the common stock is offered for sale although as high as $30.00 per share has been bid for it. (Par value $10.00.)

Some of the preferred stock has been sold at $9.50 per share (par value $10.00), at which price it yields about 6 1-3 per cent on the investment.

The cumulative dividend fund provides a pretty steady market for such preferred stock as may be offered for sale although an increasing demand for it is found among acquaintances and friends of stockholders—many of whom are glad to know of this opportunity to invest small sums where six per cent can be earned without constant worry and fear that the principal sum may be at risk of total loss.

Stockholders are glad to tell the story of these companies, it has given them a new point of view, they are now partners in an enterprise which their own capital has created, they believe

in it, they know it is making good, and they are glad to know that they are privileged to recommend it to their friends.

This story of why these companies exist and how they came to be started is told here because many employes have wanted to have something in print which they could hand to their friends, showing how and why this idea of an employes' saving and investing fund can be made successful if properly planned and efficiently operated.

If you want to know more about it, ask an employe of one of the member companies of the National Electric Lamp Association. If he isn't a stockholder in one of the Nela companies he can refer you to some one who is a stockholder and who will be glad to answer questions about the Nela enterprises.

> Don't look on your men as so much raw material, but endeavor to make the most out of them, but do not waste much time on the man who thinks only of himself and not what he can contribute to the progress of the organization.
>
> —HENRY L. DOHERTY.

In a letter to the Bureau of Standards at Washington, Mr. Doherty gave his ideas as to what the public is most interested in as regards public utility service:

BUREAU OF STANDARDS, Washington, D. C., March 9, 1912.

Gentlemen: I have run over the proof sheets you sent me very hurriedly, and will offer the following comments at this time. Later, if possible, I will go over these proof sheets with greater care and write you more fully

On the whole, I want to express my appreciation of the work you have done. I sincerely trust that, if necessary, you will sacrifice speed for the sake of accuracy in putting this pamphlet out to the public. I think you are pursuing a wise policy in sending proof sheets for the comment and criticism of those who might be in position to give beneficial advice.

Under Section B you say: "The following sections are prepared as a discussion of the various phases of municipal gas regulation from the point of

"(1) Good service to the consumer;

"(2) Limitations practicable from the manufacturing, distributing, and financial standpoints;

"(3) Inspection specifications sufficient to accomplish these first two objects."

I do not exactly know why these particular divisions are made. As a rule, in anything I attempt to do I assume that the public are interested in three things—which I will name in their order of importance:

(1) Complete service from a geographic standpoint;

(2) Good service, and

(3) Low rates.

The public are so apt to assume that they are interested primarily in low rates that they are very likely to take a position that will defeat the other two divisions—which are really of greater importance to the consumers or the community as a whole.

It is not infrequent that a gas company is forced to sell at a rate which makes extensions into sparsely settled suburban districts impossible; and there is little consolation to the householder who dwells beyond the zone of great density of population in knowing that the people in the densest zone can have gas at 80 cents a thousand while he cannot even buy gas at $1.50 a thousand.

The first duty of a gas company, as I see it, is to give the most complete service possible from a geographic standpoint. Next comes the importance of good service. I am satisfied that the consumer enjoying good service from every possible standpoint is better off paying $1.00 a thousand for gas than paying 60 cents a thousand for poor service; and I mean by this not simply service at the consumer's meter, but properly selected consuming apparatus on his premises, and this consuming apparatus supplied with a quality of gas, and under such pressure conditions, as to give him the highest degree of satisfaction and economy.

The matter of rates is one which needs scientific treatment, and which may not properly belong to the Bureau of Standards;

but we can never expect to develop our market properly when we are tied to the present inequitable method of selling both a service and a commodity based only on the quantity of the commodity consumed. The wonderful progress made by the electric companies has been due primarily to their departure from the erroneous idea of trying to sell current at so much per kwh. Eventually I hope that we will be able to break down some of the traditions of the gas business, and in breaking down these traditions work under natural economic conditions that will eventually enable us almost entirely to supplant solid fuel with gaseous fuel.

Under Section 2 of B Division you say that, in general, less than 10 per cent of the gas is employed in open flame burners. This statement is a safe statement, and cannot be questioned; but I think it does give a wrong impression, because the reader would naturally assume that the amount so used was not greatly under 10 per cent. To the best of my knowledge and belief, not to exceed 4 per cent of the gas used in our various Western cities is consumed in open flame burners; and I do not believe that even in the Eastern cities that as much as 20 per cent is thus employed.

However, a high candle power gas does not work satisfactorily in incandescent gas burners, and the tendency is, therefore, both on account of the high candle power and on account of the difficulties which attend its use, for a very much larger amount of gas to be used in open flame burners where a high candle power is employed; there is no question in my mind but what the public as a whole would be very greatly benefited if these high candlepower standards were reduced. This would naturally lead to the substitution of mantle burners giving on the poorest gas a very much higher illuminating value than is now secured in open tip burners.

Personally I would like to see you take a more decided stand in favor of a single standard—and that being the heat value. A candle power standard is woefully unsatisfactory. There is more opportunity for errors due to personal equation, and no end of friction can result. Under any gas making method now known it is impossible to give a low candle power gas if a reasonable calorific value is specified.

I have endeavored from time to time to develop some form of photometer that would not permit of this wide variation in

the result secured by different observers, but as yet I cannot offer anything that will reduce the measurement of candle power to a more exact determination; and I know this subject has agitated the minds of many other gas men, some of them the brightest in the country. If there is no other argument for the abandonment of candle power standard, the one fact that different observers can get wide variations in results is alone a serious one.

Under the heading "Candlepower v. Heating Value," you rather leave the inference, if I read correctly, that the higher the calorific value, or else the higher the flame temperature, the more desirable a gas is for gas engine use. My own work would lead me to believe that, in general, the lower the flame temperature the more advantageous is gas for gas engine use; and I would point to the fact that the highest efficiency in the use of gas engines has been secured with blast furnace gas, and next to this it has been secured with natural gas.

When we are speaking of gas having the general composition that either carburetted water or coal gas has, I think we can say that its value for mantle lighting can be measured with reasonable accuracy by its calorific value; but for gas engine use this is hardly the case. And while none of the gas ordinarily supplied for city distribution is best adapted to gas engine use, generally speaking, that gas having the lowest flame temperature will in actual practice yield the highest efficiency per million B. t. u. of gas supplied.

In your reference to the precision of candle power and calorific determinations you do not state the possible variations that can occur in practice on candlepower measurements; but you leave the proper impression that they can be so wide as to be the subject of much friction.

In speaking of calorimeter measurements you speak of 3 per cent. I am willing to concede that no greater difference should prevail than 3 per cent when made by different observers; but in my actual experience I have found that the variation was very much above 3 per cent. In fact, the great differences which were reported from time to time caused me several years ago to devise a different form of calorimeter, and one that was intended primarily to make these differences impossible. It seemed to me that what we wanted in a calorimeter was not something that

could split hairs, but an instrument that would insure reasonable accuracy no matter in whose hand it was placed.

I am enclosing a pamphlet descriptive of the calorimeter I designed, and which I have now been using in practical operation for probably five or six years. I can take one of these calorimeters and place it in the hands of a man who has never before had any experience in the use of a calorimeter, give him a large sample of gas, and he will run off test after test without a variation of more than ¼ of 1 per cent; or can take a different operator each time and every test will fall within a difference of ¼ of 1 per cent.

I will also arrange, if you wish, to have one of these calorimeters shipped to the Bureau of Standards for their investigation. It is based on a principle which I believe practically eliminates the possibility of error, as every cubic inch of water that passes through the absorption chamber will supply a cubic inch of gas to the burner.

This calorimeter is fundamentally in the line of displacement calorimeters, and I had hoped that it would be adopted as the American standard rather than to take second place to a German calorimeter—or even be placed on par with a German calorimeter that, to my mind at least, is neither as practical nor as accurate as the calorimeter which I have devised and adopted.

I have not, however, attempted to push this calorimeter, because it has simply seemed impossible to inject any progress into the gas men of this country, and, as with much of the work I have done in recent years, I have just simply used it myself and waited for the time to come when conditions would compel the gas men of this country to give earnest and unperjudiced consideration to the problems which are constantly confronting us.

I am reading your proof with a supercritical eye of one who knows that each statement will be interpreted to back up some drastic contention of some local city official, and under the head of "Candle Power Required" I would call your attention to this statement:

"If a reduction of the candle power to this figure is allowed in cities now receiving more than this quality, the price of the gas would be expected to be lowered correspondingly."

Now, while you do not say that the price of gas should be lowered ratably with the candle power, I am afraid that sentence might be so interpreted. And to illustrate by an exaggeration, we will assume that if it was interpreted to mean "ratably," then if a gas company supplied a blue water gas this would mean that they should receive no pay for the gas. In our Western cities a reduction of candle power would only effect, say, 4 per cent of the entire gas used, and much of this 4 per cent could be more advantageously used in mantle burners. Candle power becomes relatively unimportant, and the average city could well afford to accept a little reduction in candle power for almost any other advantage.

I agree heartily with you in your statement, that when a B. t. u. and a candle power value is stated there is no reason why you should distinguish between coal gas, oil gas, water gas, or any other kind of gas; and yet there is much in your proof that would tend to indicate the advocacy of a high candle power for water gas. While I cannot now point to the exact language (and perhaps no such exact language is used), I think you are leaving the impression that a reasonably high candle power is desirable. I do not believe that this is true. As I have before stated, I contend that the great bulk of the gas is only interested in the number of B. t. u. available.

Now, let us assume that instead of selling gas at so much per thousand cubic feet we were selling gas at so much per million B. t. u. let us assume that we were to take a 16 cp gas and dilute it with 25 per cent air. You will find in practice that this gas will work very much better in everything but an open flame burner; and when we stop to analyze the problem we will see why this should be the case: Instead of compelling our gas to draw in by induction, say, six parts of air, it must now draw in only a little more than four parts; and it tends to give us greater stability against variations in gravity or pressure in the snapping back of our mixtures when they have once been properly set, and also gives us the equivalent of a higher pressure without changing in the least the composition of the burning mixture.

Under "Heating Value Specifications," you say:

"Therefore, in the most efficient forms of apparatus the 'net' heating value of the gas represents the maximum amount of the energy available."

This is hardly true, because there are too many exceptions to the rule. For instance, I have built and operated a water heater in which the water of condensation in my gas would run out of the bottom of the heater as a liquid. Also in every room heater that is connected without a flue the heat of condensation is as usefully used as any other portion of the heating value of the gas.

I would like to see the Bureau of Standards take a strong stand against the use of the "net" heating value of the gas, for it is bound to lead to great confusion and complications, and open up all sorts of opportunities for errors and disputes. When we now make a test of a boiler we do not take the net heating value of the coal but take the gross heating value.

It was rather amusing when Prof. Bone visited this country and talked about an efficiency of 90 per cent, and on investigation his 90 per cent was found to be figured on the net heating value of the gas, in spite of the fact that he used a countercurrent feed water heater which discharged his flue gases at a maximum temperature of not over 95 degrees Centigrade and often as low as 55 degrees.

While there are many reasons why the gross value should be used (because there is no warrant for using any other value), yet this one matter of complications in stating efficiencies is alone enough to warrant the use of the gross value exclusively, doing away with the term "net value" but providing some term showing the amount of deduction that can be made as representing the latent heat of the vapor of water formed in combustion.

You state immediately before this the following:

"In the usual makes of flow calorimeter, which is the type of instrument generally used for the determination of the heating value of gases, both gross and net heating value can be readily determined, the latter with somewhat higher precision as the gross values are influenced by variations in atmospheric humidity."

Now, it seems to me that that statement is in error, as I do not think you can determine the gross and net with equal accuracy but can always determine the gross with greater accuracy; I do not see but what the net values are just as much, and often more, influenced by the variations in atmospheric humidity. I think on further thought you will agree with me in this state-

ment; but if you do not, I will be glad to be corrected if I am wrong, and, on the other hand, if I am right, and have not made myself sufficiently clear, I will endeavor to do so.

I have now found the section to which I referred, in which you make the statement that "the low heating values can hardly be said to give the best service," and this occurs under your heading "Heating Value Required." I have already pointed out to you that a gas with a premixture of air would give better service than a gas without this premixture; and I also think I could demonstrate that there are other examples where the low heating value gas, if of a certain character, would, for certain service, give best service.

I will comment on the matter of purification of the allowable sulphur in gas in a separate letter; also on pressure conditions.

In commenting on coal and water gas you make the statement:

"Many manufacturers claim that under the same circumstances coal gas is the cheaper, but the difference would scarcely exceed a few cents per thousand cubic feet under ordinary conditions."

It is rather difficult to talk about relative cost of coal and water gas manufacture. It is not unusual to be able to carry on your entire operations much more economically with a combination of coal and water gas, even though the cost of your water gas exceeds the cost of your coal gas by many cents, as we generally speak of manufacturing cost.

The question of the use of water gas is largely one of the load factor in every plant—and not only load factor but also character of load curve. An attempt to make coal gas entirely in some plants would require a greatly increased holder capacity, would require maintaining gas benches fired and in reserve but not in use, and would require starting up and shutting down coal gas benches or coke oven plants at an enormous injury to the setting each time they were started up or shut down, or else to avoid the starting up and shutting down they would have to be kept under fire the entire year at great expense for fuel and labor. I think that clause, of the entire report, ought to be rewritten.

In the clause in which you provide for fines for various deficiencies, I think it would only be fair that some of these fines,

say, for instance, a low calorific value, should be based on the number of thousand of cubic feet of gas sold.

In your ordinance providing for the testing of gas you state:

"Unless otherwise provided, a cubic foot of gas shall mean that amount of gas which occupies the volume of one cubic foot under pressure of thirty inches of mercury and at the temperature of sixty degrees Fahrenheit, when saturated with water."

I do not see why you should provide the saturation with water vapor, because the conditions under which we sell gas do not give a measurement at the meter when saturated to 100 per cent.

There is one point in purification that I want to call your attention to in this ordinance, and that is the clause providing for the use of white filter paper on which the gas jet is not allowed to impinge. Now, unless you make this more definite as to providing for a containing vessel to be placed around the paper, or else in some way to insure that the paper is equally exposed in every case, you will find that your present provision will, I think, work out very unsatisfactory in practice.

I do not know exactly how best to do this, but I might tell you the method I formerly used when working as a foreman in a gas works to get reasonably comparative results: I used to roll a piece of filter paper around my lead pencil and, after making a roll of it, would wet it with acetate of lead and then place this tube of wet paper over the pet cock of the purifiers. As these purifiers generally operated at a constant pressure, I could by the use of a stop watch pretty accurately determine the amount of sulphur in the gas I have not yet found any method that is more practicable than a tube of paper wet with acetate of lead and with a stream of gas flowing through it at a given rate and for a given time.

Yours truly,

HENRY L. DOHERTY.

The biggest part of the railroad fares in this country is paid in some way, directly or indirectly, by commercial enterprises. The wage earner rides but little, and for every penny that we saved the wage earner up to the time the European war broke out, for every penny we had saved him indirectly in riding on railroads, we had cost him ten pennies in the price of food.

—HENRY L. DOHERTY.

Wide as are Mr. Doherty's engineering and financial interests, he still has time to give to careful study of economic and sociological questions. In 1912 he prepared to carry out an idea which had been in his mind for several years—the preparation of a sociological plan to coordinate capital and labor in such a way as to minimize friction between the two. This plan was to have been embodied in a book entitled "A Scheme in Sociology," but the press of other work prevented its completion. Some of the "yellow sheets" contain the penciled outline of the book, its purposes, and a tentative introduction.

OBJECTS:

1st.—To give all so far as possible an equal chance in the world of industry.

2nd.—To eliminate distinction between classes such as the investing and working classes.

3rd.—To establish uniform conditions of finance, commerce and industry.

4th.—To stimulate and promote the prosperity of the American people.

5th.—To stimulate and develop invention and industrial progress.

6th.—To encourage saving and industry.

7th.—To develop the resources of the country—the mines, the fields, the water powers, navigation, transportation, etc.

8th.—To stimulate ambition and learning.

9th.—To make the American people of better morals and of greater independence.

10th.—To give every workman and producer the opportunity to fill a field of greater usefulness both to his own advancement and to the good of the community.

11th.—To extend the plan of cooperation of both capital and labor.

12th.—To stimulate the American workman to greater skill and industry.

13th.—To make every man fill a larger sphere of usefulness in life.

14th.—To make every city a financial center within itself.

15th.—To discourage gambling and promote investment speculation.

PLANS:

By creating a powerful society of all classes to put their shoulder to the wheel and execute every good plan devised for the elevation of the American people as a class.

1st.—To make all classes investors by—

(A) By the formation of a trust company to issue bonds of smaller denominations.

(B) By creating local, state and national associations for the guaranteeing of these bonds.

(C) By payment of monthly dividends on stock.

(D) By issuing stock in fractional shares.

(E) By creating trust funds to further supplement the guaranteeing power of the local associations.

(F) By the publication of an investors' journal, aimed to teach and promote the science of finance.

PRELUDE:

It is time for the American people to stop and have a heart to heart talk with each other.

The president of the trust must leave his busy office and forget the legal entanglements, the menacing legislation and the stringency of the money market and must seek out at the appointed meeting place the blacksmith who has silenced his anvil, has wiped the perspiration from his brow, and laid away his leather apron.

They must meet and reason with each other as brothers. They must forget all else save that

1st.—They are both patriotic Americans anxious to promote the integrity, welfare and progress of the country.

2nd.—That being true Americans they are too proud to ask for anything more than a fair show.

They must say "I am here at this appointed meeting place in the spirit of humble service to my country, I am a man of my word, and I pledge myself to do my duty to my country to the best of my light. We have much in common, let us reason together and find a plan which we can both endorse and execute."

The American people can only reason together by written communication. This prelude is the meeting place and the body of the book the plan.

NOTES FOR PRELUDE:

Imagine a field of battle without military organization and no uniforms or other marks of distinguishment on the contestants, with new recruits constantly arriving and being told to go out into the field and fight, using their own judgment of who is friend and who is foe.

In a political way (using the word political in its scientific sense) this is the spectacle of the present state of the American people which presents itself to the writer.

A class hatred is being generated which is growing more and more intense. We should stop and adjust our differences while there is yet time.

Reason and Hatred are not harmonious tenants. Reason is less aggressive and when Hatred comes in, Reason is apt to move out.

Let us reason together, before Hatred has taken complete possession of our mind.

Down deep in ourselves and further back than our vocal organs, we know

1st.—That no class are as bad as their enemies paint them.

2nd.—That no class are as perfect as their friends paint them.

To those of you who only know one class, let me vouch for the fact no class are all good, and no class are all bad. I think I know them all pretty well and they are all just human and each are as a class much better than the other class believe them to be.

But even if this is not true, they all are striving to better their condition and lengthy argument is unnecessary to prove that a people fighting amongst themselves will hurt the people as a whole no matter which class triumphs.

Are we suffering from grave social wrongs?

If we are, shall we sit idly by while the classes attempt to destroy each other?

Shall we leave this problem to the solution of prejudiced advocates of each class?

Can we believe that a prejudiced press, platform and pulpit can speedily settle this matter to the satisfaction of the interested classes and the non-combatant masses?

Can we leave this question entirely to the blind and cumbersome system of the ballot?

Would not these questions have been settled long ago had the ballot been sufficient for their solution?

That there is a demand for such a plan is evidenced by the history of the insurance companies of this country.

Under the guise of life insurance investment bonds or participation in blind pools were sold.

Few investments are open to the man of moderate means. That is why I do not think investments open to the men of moderate means can ever be very generally adopted.

Bonds are generally issued in denominations of $1,000.00 each. Stock in denominations of $100.00 per share.

Every investment open to the man of moderate means is open to the man of great means and the man of great means has many other opportunities besides.

1st.—Savings Banks.

2nd.—Life Insurance with an investment feature.

3rd.—Membership in Building and Loan Associations.

4th.—Purchase of homes.

OBJECTIONS:

1.—Savings Banks.

1st.—Not necessarily safe.

2nd.—Not sufficient margin of profit to interest middle men.

3rd.—Not popular.

4th.—Not profitable enough to permit active pushing of business.

5th.—Has a heavy expense with no better opportunity than others for investment and forbidden by law to take up many safe and profitable investments.

6th.—Do you ever suppose so many cash registers would have been sold except by putting price high enough to interest middle men?

7th.—Does not appeal sufficiently to a man's pride.

2.—Life Insurance.

1st.—No better opportunity for investment than enjoyed by others.

2nd.—Heavy expenses to transact business.

3rd.—Had millions of obligations which detracted investors.

3.—Building and Loan Associations.

1st.—One member profiting at the expense of the other or one class profiting at the expense of the other.

2nd.– Heavy expenses for transacting business with incapable or volunteer service.

4.—Buying Homes.

1st.—A panic will cause them to lose all they have.

2nd.—Keeps their nose to the grindstone.

3rd.—Prevents them from selling their services in the highest markets of the world.

Supplemental companies can be formed in each city.

Special guarantee funds can be created to be liable after the local companies' funds have been exhausted.

Show the increase in wealth if all earning power could be capitalized. Show how when a business becomes stable its earning power can be properly capitalized.

1st.—Take a water power plant.

2nd.—Then an interurban railway.

3rd.—Then a laundry.

4th.—Show how fixed property can be better capitalized, but show in contrast the example of a bank whose assets are the most easily removed.

Show how contrary to general belief wealth is not secured by a high dividend rate per se but by the increased value of the securities held.

Show how the man who takes the risk and is capable of making dormant property earn money is entitled to all he can make.

Take the street car example of the unearned increment.

Show how high rates of money depreciate the values of securities.

The people talk about the "System," meaning the Standard Oil group of financiers and their associates. The word is a bit too comprehensive to express the truth, but the proposed plan would be a "system" in truth, beside which the old system would shrink into insignificance. It would mean the acquisition of the talents and judgment of many of the best men in every city of the country and from amongst these men would come the financial giants of the country.

Every man with a business, every man with an idea, every man with an invention and every man with any ability could apply to receptive group of financiers in every city in the country.

It would be a "system" of the masses for the benefit of the masses.

1st.—The possession of even two hundred dollars or less, to have enabled the owner to have financed an opportunity, an idea, or an investment might have made many a man a millionaire—the lack of it at the proper time may have kept this man a workman all his life.

2nd.—Speculation thrives on violent fluctuations. The professional speculator learns how to anticipate fluctuations. The public often mistakes anticipation for manipulation.

3rd.—There are hundreds of water powers yet to develop.

There are millions of tenement houses to be built to accommodate the American workman and he can pay a good rent and pay it sure if he has steady employment.

The family that now lives in two rooms will rent four, and so on ad infinitum—a plan of general expansion.

The man who now wears one shirt a whole week will wear more—perhaps a fresh one each day.

The family that now eats meat once a week may have meat each meal.

Nearly every human being wants more than he has and will buy this "more" and give work to others if his earning power can be increased either by higher wages or more steady employment.

It is simply a question of each of us providing certain wants of others—money is merely the medium of exchange.

During the period of prosperity we are now passing through (May, 1912) the labor conditions have become extremely unsatisfactory. The class of wage earners who found only irregular work at $1.25 and $1.50 per day of 10 hours are now receiving $2.00, $2.25 and $2.50 for 8 hours' work with a demand for their services which furnishes work whenever they are willing to work.

In many places due to wage earning greatly in excess of their previous mode of living has caused an unusual amount of

drunkenness, rendering labor less reliable than heretofore. The non-drinking and drinking wage earner has become unduly independent, working and refusing to work as they see fit.

This condition has become so acute that it has become the plan of some employers to pay off their men every night, thus giving them an opportunity to get rid of their money as quickly as earned without having enough at one time to cause a long debauch which incapacitates them. The Cincinnati Gas Coke, Coal & Mining Company finds this an improvement.

The wage earner is told by the self-constituted sage to buy a home and in the next breath he is told not to go into debt. If there is particularly pernicious form of indebtedness it is that of home buying, because the indebtedness assumed is so gigantic compared with the original capital. For instance, a man has $100.00 and pays that in on the purchase of a $2,000.00 home. He has then contracted an indebtedness of 19 times his original capital which in event of his failure to meet as it becomes due will jeopardize the entire amount paid in. Real estate is one of the most non-liquid of assets, finding the fewest number of purchasers, the first thing to be affected in case of a panic and the last thing to recover. The minimum limit of value of a given asset is roughly measured by the number of purchasers it has. Wage earners' homes have relatively few purchasers compared with the asset which I recommend and further, in event of general depression other natural purchasers are also embarrassed and unable to purchase.

Wealth vs. Capitalized Wealth.

If a man finds and develops a water power what constitutes
- The value of it?
- What it costs?
- What it earns?
- Or what duplication value?

Every city to have stock exchange
- New York and larger cities, 9 to 3.
- Medium city, 1 hour each day.
- Small cities, 1 hour each week.

The value of the securities would depend upon the stability of the
- (A) State organization.
- (B) City organization.

Let us assume that

Ohio stands best as a state organization and Cincinnati the best local organization in the state. The sum of the percentage valuation of the city and state would determine the valuation of the security aside from the individual enterprise.

Money prospers on either prosperity or adversity.

Adversity.

(A) By cheapening of money rates and hence the enhancement of security value.

(B) Ability to buy cheap through the necessity of others.

Labor prospers only on prosperity.

If legislators do not think it wise to permit all funds to be invested in these bonds then they could permit

(A) A certain percentage to be so invested, or

(B) A certain percentage of each local company, or

(C) A certain percentage of each state.

Laws could be passed making these bonds a proper investment for

(A) Public funds.
(B) National banks.
(C) State banks.
(D) Savings banks.
(E) Sinking funds (public)
(F) Sinking funds (private mortgages)
(G) School funds
(H) University funds.
(I) Trust companies
(J) Guardian funds.
(K) Executors' funds.
(L) Corporation funds.
(M) Charitable organization.

In addition to this these bonds would be a proper investment for the local and state guaranteeing companies, provided they purchased bonds of other states.

Provide for joint action of one or more local companies for issuance of large blocks of bonds such as interurban railway bonds.

No matter what is suggested, it is never just right.
—HENRY L. DOHERTY.

The national situation regarding waterpowers was outlined by Mr. Doherty in his opening address before the 1912 meeting of the Power Transmission Section of the National Electric Light Association:

THE Power Transmission Section was organized at the St. Louis convention in 1910.

Its purpose is to organize the men skilled in or otherwise interested in the construction and operation of hydro-electric plants, and also in power transmission by means of electricity, no matter how such electricity may be generated.

There has been heretofore no common association or society where the men essential to this work could meet, exchange views and cooperate. There are many people of varied professions and occupations interested in these subjects; for instance, the hydraulic, the civil, the mechanical and the electric engineer, the capitalist who furnishes the money, the banking and bond house that sells the securities, the power user, etc., etc.

The detail of organization has proceeded slowly but substantially. The men interested in this work are widely scattered and time will be required to bring about their amalgamation. An example of the growth which may be anticipated is furnished by the Commercial Section. In 1902 we endeavored to have one day devoted to commercial work at our convention in Cincinnati, Ohio, but were either unable to find men interested in the work or to enlist their support. In 1904 we first gave a portion of our time to commercial work, and this work grew constantly in volume and importance until in St. Louis, in 1910, the Commercial Section was organized which now has 1,325 members and is doing work of greater importance and scope than would be indicated by this volume of membership. It remains to be seen whether the original members of this section have enough of the commercial spirit to reach, awaken and secure the cooperation of the vast number of men interested in power problems.

A more descriptive name for this section would have been the Hydroelectric and Power Transmission Section. Its work, if properly done, will have a vast bearing on the progress and prosperity of the entire country. There still remains in this country over thirty million horsepower of undeveloped waterpower, which alone represents an enormous reservoir of latent

wealth slowly being brought into use, but by the work of this section the realization of this wealth can be greatly accelerated. Much of this power lies far distant from any existing market, but the essential factors for creating a market are oftentimes near at hand, and if this section should devote itself merely to the problem of how this power can be transmitted to existing markets (important as this is) it would fail to realize its full opportunity.

There are numerous electrochemical processes that require primarily cheap power rather than advantageous geographical location, and it is only necessary to transmit this power to some reasonably economical transportation system. Much of this undeveloped power lies within transmission distance of water transportation and with cheap power delivered at tidewater the markets of much of the whole world are available. As another example, there is much arid and semiarid land which lies at too high an elevation to be irrigated by gravity, and yet an abundance of water can be taken from wells or nearby streams and an abundance of hydraulic power for pumping can be secured within a distance which is readily available for transmission by means of electricity. Many of these creative markets do not demand absolutely uninterrupted service, thus permitting the use of single transmission circuits of the cheapest possible construction and the use of the highest voltages. We are already transmitting electrical energy for distances to exceed 200 miles, and in some instances using voltage as high as 140,000, and both voltage and mileage pertain to service which must be of the highest type of reliability.

Probably within the coming year a competent committee will be put to work to outline all of the present possibilities of these distant powers. The very fact that some of these uses do not demand complete freedom from interruption will enable us to do the necessary pioneer work to carry us to greater voltages and greater distances.

Aside from the problem of bringing our hydroelectric power to a market or the creating of a market for it, we have numerous problems to solve in the transmission and distribution of electrical energy, whether it be generated by fuel or water. Chief among these is the problem of how to get energy to the farm. The application of electrical energy has been so rapid that our efforts have heretofore been directed almost exclusively to serv-

ing the districts having the greatest density of consumption. We are now ready to attack the problem of how to reach all possible markets. Several central stations are pioneering in the application of electricity to the farm, and some excellent work has been done by our fellow members in the Commercial Section. The "Report of the Committee on Electricity in Rural Districts," presented to the Commercial Section at this convention, and a similar report of last year, deserve the attention of all our members. Unfortunately the time available at our conventions necessitates the use of parallel meetings and the work of the sections is bound to overlap somewhat. There is no jealousy, fortunately, in the National Electric Light Association. We applaud the enterprise and progress of the Commercial Section in the excellent work they have already done to bring about the extended use of electricity on the farm, and we promise them our support in solving the technical and engineering problems.

Farming, when carried to its ultimate possibilities, requires excellent judgment, good managerial ability and perhaps a greater amount of scientific and professional skill than any of our other professions, but, unfortunately, as now conducted, it also demands the hardest kind of manual labor. Plowing must be done when fleeting conditions are propitious, and crops must be gathered when they are ripe, and neither at the convenience of the farmer. Applying an electrical term to farming, we might say that farming has a very bad load factor. Electricity on the farm will largely displace manual labor and make this occupation more a contest of professional skill than of bodily strength and endurance, especially in the South, where Nature's conditions favor the growth of crops to the impairment of man's ability to labor. In extending the use of electricity on the farm we are confronted with new and difficult conditions. The density of consumption is so light that prevailing methods of transmission and distribution are inadequate. We must look to our commercial department primarily to secure the application of all known uses, and to the engineering fraternity at large to develop the means of distribution and the creation of the appliances that are to supersede manual labor. We must also enlist the support of the scientific farmer in finding new uses for electricity in agriculture as a means of increasing the density of demand, thus bringing about greater sales of energy to support the investment

cost of building the necessary transmission lines. Even in sections generally supposed to have abundant rain, irrigation by means of electric pumping can be made profitable. It has also been found that the growth of crops can be greatly stimulated by the use of a suspended network of wires, upon which is forced a high electrical pressure. With the advent of our new high-efficiency lamps even in the smaller units and the greater use of the automobile it is not unreasonable to expect the adoption of lighting systems for our country roads. This will do much to aid in bringing about the supply of electricity to the farm.

It is rather interesting to note that the greatest obstacle to the development of the millions of horsepower of hydraulic energy still unused is the United States government. Under the guise of the conservation of our natural resources, a remarkable school of political economy and statesmanship has sprung up. It would be humorous were it not so serious. We are told that we must conserve our natural resources for the sake of posterity, and we have been saddled with an alleged plan of conservation which has brought about most flagrant and inexcusable waste, which has stagnated development and prosperity in our great western country and has turned the stream of pioneer settlers toward Canada.

For many years the conservative statesmen of this country have regarded the public lands as a public trust to be used for the development of the section in which they are situated, but the new school of alleged statesmen, after inaugurating a campaign of misrepresentation and hysteria, have construed the ownership of the public lands to be theoretically for the enrichment of the federal treasury, although in practice millions of dollars have been spent or wasted in applying the mistaken theories of impractical men. Areas more than one hundred times greater than some of our smaller eastern states have been withdrawn from entry since this conservation policy has been ushered in. Millions of tons of coal have been mined and burned to furnish power that might have been generated by water now running idly to the sea. Millions of acres have been withdrawn from entry and much reserved for national forests, primarily on the theory that this policy conserves the flow of the streams. It is certainly not proved that the forests do conserve the flow of the streams, and it is a matter capable of easy proof that forests

do not conserve the flow of the streams as well as the tilled soil does.

The public lands, instead of being assets to the states in which they are situated, have become a great obstacle to their growth and development. Great railroads cannot be operated successfully when large stretches of unproductive, uninhabited lands must be passed. Natural development is thus discouraged and retarded. Large numbers of our desirable western farmers are migrating to Canada. Waterpowers that might be constructed and which would bring about new industries are lying idle, and it is not to be wondered at that many intelligent people express contempt for conservation when in reality they intend only to fight this false conservation that has been thrust upon them by an impractical school of fanatics and theorists.

The opposition of the government has spread to other bureaus and it is now almost equally difficult to get permission to make a waterpower development of the navigable streams, even although many of these streams are navigable only by chips and small logs. Permission is now being sought for a reservoir on one of these navigable streams, which is in fact non-navigable, and in addition to the other burdens which the government wants to impose, the secretary of war insists that the builders shall pay such rental for the site as the secretary of war may fix from time to time, and in addition to this the secretary of war shall have the right from time to time to regulate the rates charged to consumers. This particular reservoir will be a small portion of a large steam generating and distributing system, serving over 200 square miles of territory in two different states. Imagine the secretary of war adding to his legitimate duties the regulation of electric rates, and the poor electric company submitting not only to the inherent regulation of rates which each state undertakes for its public service corporations, but to those of the secretary of war as well.

We are passing through a period when the builders of the great enterprises of the country are regarded as public enemies. Building operations have been carried on for the past five years at less than normal rate and a continuation of this condition must inevitably bring the whole country to a low ebb of prosperity.

I cannot but contrast the policy of the administration of this country with that of Germany. History will paint the German

Emperor not as what we see him caricatured today, but as the man who retrieved German commerce and industry. The enormous German immigration which helped for many years to populate this country has almost ceased, and only recently I was told by the publisher of a large German newspaper that the day is fast approaching when there will be no call for a paper such as his, published in the German language. In Germany if a man builds up a great enterprise they decorate him, but in this country we try to send him to jail. The German policy has told its story in the wonderful prosperity which an apparently disintegrating country has attained in a few years and our policy if continued will in time tell the opposite story.

The policy of our government is simply another symptom of a widespread hysteria. The people believe there is something wrong and stand ready to follow any unscrupulous demagogue or impractical dreamer who promises to correct these wrongs, and, as in our conservation movement, practically everything that is done accentuates the wrongs of which they complain rather than corrects them. In spite of the statements of our new school of alleged statesmen and our muck-raking publications, the American business man is the most honest and reliable of his class in any country, and this statement is borne out almost universally by foreign business men who do an international business. His reputation is maintained in spite of the army of muck-rakers, who never fail to accord a gratuitous insult to the American business man whenever opportunity affords, to the great delight of our many foreign enemies.

I wish we could quit fighting symptoms and devote our time to the underlying disease. The public has come to believe that there is something radically wrong in our business methods and seems to be willing to follow any man, no matter how incompetent he may be, provided he is sufficiently intemperate in speech. If wrongs exist they should be corrected, and if these wrongs are imaginary they should be explained away. The business men of the country should inaugurate a new move, if not for their own protection, then to free our people from incompetent leadership which can bring only harm to us as a nation.

I cannot resist the opportunity to illustrate some of the problems that confront us and I hope that the transmission sec-

tion may have a large part in the solution of those problems. Many of our hydroelectric developments are strictly hydroelectric property, but if they were developed in connection with irrigation, that is with water to be used for both power and irrigation, it would make a great many more installations possible. Not only that, but we have many hydroelectric propositions in this country which lack a market, and irrigation by furnishing this market would add to the profit of the plant. It may seem like a far cry from central station business to irrigation business as the latter is considered by some a risky business, while the central station business has come to a point where it is regarded as one of the safest we have, but I think I can venture to say that many central station plants will find themselves in that business before long. I did not know until tonight that the Pacific Gas and Electric Company was in that business.

I also have a question to ask as to the efficiency to be got from these pumping plants at various depths. One of my friends complains that he cannot get information from engineers. His question is this: "From what depth can I afford to pump water for irrigation purposes?" (Laughter.) I told him there were a lot of questions for him to answer first, the value of the land the crops to be raised and conditions generally, before anyone could tell him how far he could pump the water. When I learned that he was raising Bermuda onions at about $600 per acre, I figured that he could pump water practically from the bowels of the earth. (Laughter.) Certainly the 30 to 60 foot well of which our friend speaks is not the limit if crops are of sufficient value.

Sometimes in New York City I feel like talking about what is done in Colorado and in the west, but I am afraid to because my reputation is not sufficient for me to tell the truth about it. Out here, however, it can be done safely. In reality, then, crops to the value of $3,000 on a single acre and many fruit lands from $700 to $1,000 an acre are not unknown. Many of us who live in New York City and get our opinion of farm lands from what can be produced in that locality do not realize the possibilities which the farm offers to the promoters of electric enterprises.

Recently a problem in hydroelectric work came up in our office and we found that the ground was made for irrigation

work. At the prevailing rate for water it would give the equivalent of $5 per acre-foot of water, while for power purposes it was worth only $0.48; the water was worth nearly ten times more for irrigation than it was for power. A valley alongside of a great river with thousands of acres of land at an elevation too high to be supplied by water on a gravity system and yet an abundance of water and an abundance of very excellent land for agricultural purposes, is what the traveler sees from end to end of this country. I would like to have an estimate of the amount of land so situated. I think it would be a surprise to all of us.

One speaker has tried to make the point that as we develop the intervention load it will finally become the peak. It simply means going out farther and hitching another station to it. That is the reason why the central station has continued to grow from a geographic center. That is why it is advisable to cover a number of different kinds of business and large territory. Rivers such as some that we passed over in coming out here run down to the sea. Our people do not seem to realize that just that much wealth is being washed away. They complain about the rapidity with which some men accumulate riches when there is plenty of opportunity still for others to do it. If they have the proper organization and can raise the capital to create the enterprise, they, too, can do it. There are more enterprises awaiting development today than men of ability to handle them.

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The first paper on the program today is "Work and Publications of the United States Government Relating to Hydro-electric Development." The paper is by Mr. J. C. Hoyt, Washington, D. C., and will be read by Mr. Glenn L. Parker.

Before Mr. Parker is formally introduced I want to state the reason why this paper was requested of the government so that we shall get the greatest benefit from its presentation.

The government is spending a large sum of money to determine the data necessary for the development of waterpower. Much of the work that it does has a direct bearing on the information this section needs about waterpower development. Undoubtedly they could change much of their work, and would be willing to do so, if it were suggested by capital engineers and good reasons given. We are anxious to have the reading of this

paper carefully followed and discussed, and any comments, especially along the line of making the work of government more valuable to the engineers engaged in hydro-electric work, should be kept in mind.

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I was in hope that the paper by Mr. Hoyt would be particularly studied from the viewpoint of how the government work could be made of more interest and of more value to us. As we all know, there are a great many streams where the records of gauge readings run back for a few years only while the rainfall record will as a rule run back for a great many years. It is not unusual to find a stream charted with only 2 or 3 years' records of gauge readings and 30 to 35 years of rainfall.

The puzzling problem always in cases where no gauge readings are recorded is the relation of runoff to rainfall. Each water unit has its own characteristic as to primary cause for runoff; that is, how much lag there will be from the rainfall to the runoff, and what percentage of the rainfall will represent the time in actual runoff. Generally speaking, a very light rainfall would not run off because it would all evaporate. Now the runoff curve follows the rainfall curve more or less depending upon the amount of rainfall. With a very light rainfall there is none on the dry ground, whereas when you have an exceedingly heavy rainfall you get almost 100 per cent runoff.

The government on a great many streams has not only gauge readings but rainfall readings, and if the bureaus could add to their work something to show the relationship of these to runoff they could give an indication to the engineer as to how to figure on the streams and other watersheds.

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It is my individual view of the situation, and does not bind the association in any way. Before I read this I want to answer several criticisms that were made by those who heard it last night, and also to repeat what I said to one of my friends who regretted that I expressed myself in what he termed an intemperate manner.

My defense is this: It seems impossible to discuss this problem of conservation, or this idea of conservation as it is now exploited, and arrive at anything when keeping the tone and the manner of an academic discussion of an engineering prob-

lem. For instance, I do not hesitate to say that I think the men who are exploiting the present policy are not looking for the real truth, but rather are looking for a public issue, and while I have gone beyond proper form, it seems, in the strength of my statements, I believe I am fully justified in doing so.

I will take just a moment of your time to tell you of a situation that perhaps you all realize exists and is harmful to us, without knowing the source of the trouble. Five years ago I was in Germany. I had been asked by a prominent banking house in this country to take up with a London banking house the matter of selling a large issue of preferred stock. The London house refers me to a German house and I went to see the head man. He told me that nothing could be done, that they could not buy this stock. He was very courteous, while refusing to do business with me, and volunteered to drive me around to the electric light plant which I wanted to see before leaving the town. When I got off he waited to see whether I could get in with no other introduction than a calling card.

The chief engineer knew of me through my presentation of the rate paper, and I got into the plant, this young man going out to the banker to explain that I was all right.

That man's attitude immediately changed and he asked me to come into the bank that afternoon at four o'clock. When I went in after four o'clock he said, "I don't know but what we can do something with that stock issue. It makes a difference if you are personally known in this city." I said, "I am not personally known. This man knew of me as my name is identified with the electric lighting business." "Well," he said, "I think that makes some difference, and I believe we can do something with that issue of stock. You see, we are afraid of Americans over here. We do not like to take up any issue of stock or any of their financial schemes unless we know thoroughly well who they are." I was careful to inquire from this man where he got his opinion of the American business man, and he referred me to our own public officials and our own magazines: they were his authority for believing that the American business man is dishonest and has to be watched.

Now, travel Europe over and you will find that belief prevalent except in those houses that are thoroughly familiar with American business methods, and are dealing with Americans

every day. If you go to London into their large banking houses and try to associate yourself with any of these, they will probably give you a courteous hearing and bid you good day; and they will then go off and finance some scheme in Mexico, South America or South Africa, simply because they have been told by our home publications and by our own public officials that the American business man is too dishonest to be trusted. So, if I see fit to reply to these men and do it in a way which is so emphatic as to seem intemperate, you have my reason for the language I use.

The part of my address that I have been requested to read in connection with Mr. McKee's paper, is as follows:

"It is rather interesting to note that the greatest obstacle to the development of the millions of horsepower of hydraulic energy still unused is the United States Government. Under the guise of the conservation of our resources a remarkable school of political economy and statesmanship has sprung up. It would be humorous were it not so serious. We are told that we must conserve our natural resources for the sake of posterity, and we have been saddled with an alleged plan of conservation which has brought about the most flagrant and inexecusable waste, which has stagnated development and prosperity of our great western country and has turned the stream of pioneer settlers toward Canada.

"For many years the conservative statesmen of this country have regarded the public lands as a public trust to be used for the development of the section in which they are situated, but the new school of alleged statesmen, after inaugurating a campaign of misrepresentation and hysteria, have construed the ownership of the public lands to be theoretically for the enrichment of the Federal treasury, although in practice millions of dollars have been spent or wasted in applying the mistaken theories of impractical men.

"Areas more than one hundred times greater than some of our smaller eastern States have been withdrawn from entry since this conservation policy has been ushered in. Millions of tons of coal have been mined and burned to furnish power that might have been generated by water that now runs idly to the sea.

"Millions of acres have been withdrawn from entry and much reserved for National forests primarily on the theory that this policy conserves the flow of streams. It is certainly not proved that the forests do conserve the flow of the streams and it is a matter capable of easy proof that forests do not conserve the flow of the streams as well as the tilled soil does.

"The public lands instead of being assets to the states in which they are situated have become a great obstacle to their growth and development. Great railroads cannot be operated successfully when large stretches of unproductive, uninhabited lands must be passed. Natural

development is thus discouraged and retarded. Large numbers of our desirable western farmers are migrating to Canada. Water-powers that might be constructed and which would bring about new industries are lying idle and it is not to be wondered at that many intelligent people express contempt for conservation when in reality they intend only to fight this false form of conservation that has been thrust upon them by an impractical school of fanatics and theorists.

"The opposition of the Government has spread to other bureaus, and it is now almost equally difficult to get permission to make a water-power development on the navigable streams, even though many of these so-called navigable streams are navigable only by chips and small logs. Permission is now being sought for a reservoir on one of these navigable streams which is in fact non-navigable, and in addition to the other burdens which the Government wants to propose, the Secretary of War insists that the builders shall pay such rental for the site as the Secretary of War shall have the right from time to time to regulate the rates charged to consumers. This particular reservoir will be a small portion of a large steam generating and distributing system serving over 200 square miles of territory in two different states. Imagine the Secretary of War adding to his legitimate duties the regulation of electric rates, and the poor electric company submitting not only to the inherent regulation of rates that each state undertakes for its public service corporations, but to those of the Secretary of War as well.

"We are passing through a period when the builders of the great enterprises of the country are regarded as public enemies. Building operations have been carried on for the past five years at less than normal rate, and a period must soon come when the continuation of this condition will bring the whole country to a low ebb of prosperity.

"I cannot but contrast the policy of the administration of this country to that of Germany. History will paint the German Emperor not as what we see him caricatured today but as the man who retrieved German commerce and industry. The enormous German immigration which helped for many years to populate this country has almost ceased, and only recently I was told by the publishers of a large German newspaper that the day was fast approaching when there would be no call for a paper such as his, published in the German language. In Germany, if a man builds up a great enterprise they decorate him, but in this country we try to send him to jail. The German policy has told its story in the wonderful prosperity which an apparently disintegrating country has attained in a few years, and our policy, if continued will in time tell the opposite story.

"The policy of our Government is simply another symptom of a widespread hysteria. The people believe there is something wrong and stand ready to follow any unscrupulous demagogue or impractical dreamer who promises to correct these wrongs, and, as in our conservation movement, practically everything that is done accentuates the wrongs of which they complain rather than corrects them.

"In spite of the statement of our new school of alleged statesmen and our muck-raking publications, the American business man is the most honest and reliable of his class in any country and this statement is borne out almost universally by the foreign business men who do an international business. His reputation is maintained in spite of the army of muck-rakers who never fail to accord a gratuitous insult to the American

business man whenever opportunity affords, to the great delight of our many foreign enemies.

"I wish that we could quit fighting symptoms and devote our time to the underlying disease. The public has come to believe there is something radically wrong in our business methods and seems to be willing to follow any man, no matter how incompetent he may be, provided he is sufficiently intemperate in his speech.

"If wrongs exist they should be corrected, and if these wrongs are imaginary they should be explained away. The business men of the country should inaugurate a new move, if not for their own protection, then to free the great mass of our people from incompetent leadership which can only bring harm to all of us as a nation."

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The Power Transmission Section in its first activity called a public conference on the attitude of the government towards the development of waterpowers. I regretted exceedingly that we did not have Judge Ballinger and Mr. Britton there. We managed to make some progress, I think, and I believe that this meeting has done a world of good. The statements we have heard here today will at least make many men stop and think. I have no doubt there are men who came into this room believing that the policy of conservation as laid down by our fantastic friends was a wise thing for this government. It is impossible for every citizen to study and understand every question that comes up.

There are a great many people entirely honest in their intentions, who believe that this conservation movement which has locked up enormous areas of our country, is a wise policy and is benefiting the country. I do not believe anyone after careful study can recommend a continuation of that policy. If this section does nothing more than cause men to stop and think it will have accomplished good.

The great trouble with the masses of our voters, with the masses of our people, is that they express opinions before they have studied questions as they should. Imagine the state of Washington with one-quarter of its territory stretched across the state incapable of producing anything to support railroads, barren land to all intents and purposes, that must be crossed to get from one community to another, and imagine that condition in, for instance, the states of New York or Ohio or Pennsylvania. It would be bad enough there, but think what a tax it is here on the development of this new country. When we retard the development of this western country we retard our prosperity as a nation.

Before the American Gas Institute, at its 1912 meeting, Mr. Doherty discussed the efficiency of gas calorimeters as follows:

HIS is one of a number of subjects that I am interested in, but I did not intend to discuss this subject here if the particular points in which I am interested were discussed by others, and that is the reason I waited. The net and gross systems have apparently been covered pretty well, but I cannot resist adding my opinion, at least, that the net heating value has not the warrant for its use that the total heating value has, and there are one or two reasons which, if stated, I did not hear.

As far as I know, there is no appliance using gas that uses just the net heating value, no more or no less. That is one reason why, I think, the use of a so-called net heating value is not justified. I also look to see the time when many of our appliances will use a greater amount of the heating value of the gas than the net heating value and then we shall have the absurdity of appliances running over 100 per cent in efficiency. Not only that, but if we grow accustomed to stating our efficiency in terms of per cent based on the net heating value many men will be unconscious of the total loss that we are suffering in those particular appliances. They will assume that they are reasonably efficient, when in reality they are not reasonably efficient. I state this from memory, but as I remember it, approximately the difference between the total heating value and the net heating value is about 11 per cent. Now, it looks very handsome when somebody comes along who figures efficiency the way Dr. Bone figures it, and tells us his boiler has an efficiency of some certain amount that is based on a debit of the net heating value and a credit of the total heat absorbed in spite of the fact that he is discharging his flue gas at a temperature below 212 degrees. In other words, in spite of the fact that his appliance is using part of that heat as represented by the vapor of water due to the burning of the hydrogen in the gas, yet his approximate efficiency entirely ignores that and gives a false notion of the efficiency of the appliance.

Another thing, if we are going to establish a net heating value on gas then we should start in and get the other engineers to establish a net heating value on coal, because that also contains

a great deal of hydrogen, and we have for years always accepted the gross heating value of coal determinations, so far as I now remember, and with the particular calorimeters that I have used there is no way of determining the net heating value of coal by the calorimeter. It would require a separate chemical analysis. So that would mean that if we accepted the net heating value we would be out of accord with the efficiency test on steam boilers and would be at an unfair advantage whenever gas is compared with solid fuel.

In all of this discussion, both on the Bureau of Standards work and in the discussion on the other papers by the gas men, they have kept speaking about an accurate calorimeter measurement and an accurate determination of it. My experience has not been that we need extreme accuracy, but my experience has been that what we wanted to do was to avoid these enormous differences between the city inspector and the company inspector.

You all talk about a difference in accuracy for the different experiments that is almost negligible, and yet where the work has been done on the part of a gas company in one particular city, and the work carried out by a graduate of one of our leading universities, the work checked by the city inspector of this particular city, who in turn was a graduate of the engineering course of that particular university, and other work was done by a member of the faculty of that same university, there was a variation in candle-power of nearly 100 per cent. Not only that, but in determination of the heating value there was a variation in one case of as much as 20 per cent.

What I am anxious to do is to find calorimeters and photometers that are foolproof and give approximately the true results. As yet I have no solution for the photometer trouble, but my belief is that we as gas men can stand for small differences due to different emhtods of testing that often run as much as 4 per cent or 5 per cent in the hands of reasonably clever operators. I do not want to introduce the possibility of great errors in observation for the sake of getting a refinement that is not necessary in practical work. If we can get that refinement without the possibility of these large errors then I am in favor of doing it, but I am afraid we are looking too much on the side of refinements as against eliminating these wide variations that bring up friction and trouble.

I was anxious to study this paper presented by Dr. Rosa and give it a very careful discussion. Unfortunately, it did not get into my hands until this evening, through my own fault, and I was rather sorry that the doctor did not read it completely so that I should be able to read it while he was reading it and follow it and mark it for discussion. I am in sympathy with accuracy in the serving of gas to the community. I do not ask that the gas companies shall be made free from regulation, and I do not criticise, but rather applaud, in a way, the issue of the circular, the so-called circular, No. 32, by the bureau, but I predict that that circular will inspire many men to introduce regulatory ordinances for the gas companies primarily to find a job for somebody that wants it, and if that is going to be done I hope that the circular will be written as plainly and as definitely as possible.

I was also quite sorry to see that Dr. Rosa had chosen for his example the city of Denver. Denver happens to be one of those cities that has a high altitude. The price of gas has been fixed from time to time before the Bureau of Standards came into existence, and the price of gas has been fixed by those factors which are bound always to prevail; that is, the cost of serving the consumer and yet yielding a fair return on the investment.

The present prevailing price of gas in Denver, Colo., was fixed by these conditions, and I am sorry to say that the recent activity of the Bureau of Standards has led the people of Denver to believe that they are not getting all they are entitled to get. If we were to accept the contentions that the retail merchants now want, in view of this recent circular of the bureau, it would be impossible for us to earn even a nominal rate of interest return on the investment in our property there—that is, on the gas property—and I hope that the Bureau of Standards will do everything it can to make this circular as little harmful as possible. I, for one, though directly affected, am not in any way criticising the bureau. I am rather applauding them for their attempt to do good work, but I hope in doing this they will go a little bit out of their way and see that their circular is not interpreted in such a way that injustice will be done to any one.

The matter of selling and testing gas according to the barometric conditions in a city is something with which I cannot agree. If you are going to make comparisons with gas com-

panies located all over the country and under various barometric conditions, you may have to determine the efficiency of oil consumption, the efficiency of the carbonization of coal and matters of that sort. You must reduce it to some standard. We have all used the standard of sea level conditions, because we assume that we will have no case where we shall be operating below sea level, and we assume that as the zero.

Now it is necessary for us to make comparison with other gas companies to see whether the best product and the highest efficiency are being obtained in each manufacturing plant, whether it is located at an altitude of 5,000 feet or 50 feet. When it comes to the matter of selling the gas I maintain that the proper unit there is the volume of the gas under the prevailing conditions, and that any modification from the sea level conditions, from which the corrections are made for purely comparative purposes, must be compensated for in the price. The Bureau of Standards, if I interpret their position correctly, will put themselves in a position where they will have to go into the subject and say: "This is a fair price, or that is not a fair price." But when you are testing gas for calorific value, when you are testing gas for its candle-power, and when you are testing gas for any of the numerous things that go to tell the efficiency of your operating process you must reduce it to some standard conditions to which all other gas companies reduce, and when you are selling gas in a community where the barometer, as stated by the doctor, is reasonably constant from year to year, that naturally works out in the matter of price.

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I am well acquainted with the rules of debate as they are generally carried out in this institute, but there was one reference made by Dr. Rosa that I do not resent, but I think was unfortunate, and that was his assumption that in Denver we are—he used some term like "selling on short measure." I have been held up recently, because I am in the public utility business, to public censure in the press for doing things that are just as legitimate as what we are doing in Denver, and which I do not know how we are going to get away from. In view of the discussion of Dr. Rosa, I believe that I am entitled to be heard on this particular point and before this convention. When I became connected with the Denver Gas and Electric Company it was cus-

tomary for us, as it is customary for other gas companies in the United States, to sell gas according to barometic pressure, the temperature and the meter and the conditions that prevailed. It is also customary for every gas company in the country to correct those conditions to determine calorific value and candlepower value to sea level conditions. That is what we are doing in Denver, yet I can readily see how it may be made the target of another magazine story and how a sensational article can be written about how we are short-changing the people in Denver. I should really and sincerely like to know from Dr. Rosa, in view of his very decided position on this matter, just how he would treat the situation in Denver, and if he can give me a practical solution which would work out we shall be very glad to attempt it. But it seems to me that if we continue to sell gas as we do and if we adopt a standard based on present barometic conditions, we are simply opening up a new controversy on this subject, because we must have our heating value dropped so low and our candlepower value dropped so low that when anybody in Denver compares it with the same calorific value or candlepower value in some other city they say we are getting short-changed. We cannot operate in an altitude of 5,000 feet and maintain the standards that you have here on a cubic foot as it exists there without correction. That is an impossibility. The Bureau of Standards has taken a stand on this matter that has unfortunately gotten us into a controversy with the people of Denver. We do not know the solution of it. We should be very glad to find it.

In this day, when the panacea of all human ills is believed to be the passage of every law that everybody can think of, we can't assume that the laws of the country or the state represent what is common sense. When we realize that the fewest laws in number and the simplest laws in character best insure the success of the plain citizen, we will stop grinding out law to meet every impulse.

—HENRY L. DOHERTY.

A cooperative organization, embracing central stations, manufacturers of electrical apparatus and appliances, jobbers, dealers, and contractors for electrical merchandise and installations, had been under consideration for a number of years. Under the leadership of J. Robert Crouse, the Cooperative Electrical Development Association had been organized in 1907, but owing to Mr. Crouse's serious illness he had to give up the work. The interest aroused by Mr. Crouse, however, bore fruit in the organization of the Society for Electrical Development in 1912, and in the election of Mr. Doherty as its first president. A constitution was drafted, and Mr. Doherty prepared an introductory statement, which was sent to members accompanying the first draft of the constitution and by-laws, which said:

NY casual student, of national or business economics, recognizes that in the development of either a nation or an industry, real efficiency requires some basis of organization, by which collective effort can be made both morally and financially to take the place of individual effort.

Combination as an economic principle we know to be logical; and as competition is also a vital factor, we can safely assume, that combination and competition added together equal solution of the problem.

For the sake of example, let us illustrate with the impossible assumption that the various diversified interests in the electrical industry as represented by the central stations, manufacturers, jobbers, contractors and dealers, are all under the financial control of one individual or one corporation; the most logical and efficient move possible would be the unification and hamonization of all these interests so that concerted action could be taken for the development of the electrical industry as a whole.

Imagine the effect of a broad national advertising and publicity campaign in co-operation with all local advertising and publicity, and the combined sales effort of every one of the present interests in the industry. Imagine the effect of concatenated effort by the allied industries in vast educational campaigns; not only to the public, but to architects, builders, textile mills, iron and steel mills, farmers, and, in fact, to every industry and every individual; to impress upon them the value of electricity in its many ramifications.

Imagine the effect of the massed selling strength of the entire electrical industry, added to an educational effort on the part of all—for just one purpose—general development of the electrical industry for the benefit of the various interests engaged and the public which they serve.

How the Society for Electrical Development is planned to accomplish this heretofore difficult problem of unification in sales effort for the benefit of both the public and the various interests, large and small, that go to make up the electrical industry, can best be gathered from the objects of the society as outlined in the papers of incorporation and the by-laws.

It can be easily demonstrated that if the work of the society is properly executed (and there can be very little question that it will be) the small contractor, the smaller jobber, the smaller manufacturer and the small central station can hardly afford to withhold their co-operation from a movement that means to them the co-operative assistance of all of the larger interests engaged in the electrical industry; or, in other words, it means the combined selling strength of the entire industry added to their infinitesimal educational effort to develop customers and increase business for all.

To the larger interests engaged, it means that in this broad educational effort to induce the public to a greater use of electricity for light, heat and power, they will be assisted by a vast number of small individual concerns, who have heretofore, through lack of capital been unable to carry, on any basis, their proportion of the load; and who, in the feeling that their "widow's mite" would have so little effect that it would not be worth while, have withheld even that little, from becoming in any way a factor in the situation.

"There are very few of the mighty, but the many are mighty."

On Association Island, New York, September 3, 1912, was held a meeting representative of all of the various interests in the electrical industry. A special committee of five appointed by the President of the National Electric Light Association, a similar committee from the National Electrical Supply Jobbers Association, a similar committee from the National Electrical Contractors Association, as well as a number of representative electrical manufacturers, met and discussed the possibilities of a

co-operative organization to carry out, in a broad way, a co-operative effort for electrical development.

It was decided that such an organization could accomplish a result which would be felt by the entire electrical industry, and by all of the individual interests engaged in that industry, and that such an organization properly brought together and well handled would have the support of every individual interest.

An "Organization Committee" was appointed from the various interests present and this organization committee advanced sufficient funds for the carrying out of the necessary organization work. They have drafted by-laws for the operation of the society, so that the various elements in the electrical industry will be equally represented and so that it is assured for all time that the work will be of equal proportionate benefit to every interest engaged.

A broad gauge, comprehensive idea of the work which can be carried out, was submitted in a series of papers at a conference held March 4th and 5th. to which the entire electrical industry was invited; and, in addition to the discussion on these papers, and the various ideas and suggestions made during the conference, a vast number of ideas and suggestions were received by mail from various parts of the country covering the thought of the industry on the work which the society can carry out.

The Plans

It is the intention of the Board of Directors to appoint from the field at large a committee composed of men who are especially expert in the different phases of effort which the society can carry out—working with the present organization of the society, this committee will discuss the various ideas and plans suggested and will prepare a complete comprehensive plan which will allow for the carrying out of the various lines of effort decided on in the most practical, efficient manner; so as to accomplish the greatest possible development of the industry at a minimum of cost and to obtain for the industry at large and each individual interest the greatest possible benefit.

The committee as selected will be composed of well known men selected from the various interests.

The plan will be presented for the approval of the entire membership at the annual meeting of the society, the second Tuesday in May. With the approval of the membership it will

be possible to start immediately the active work of the society, as it it hoped prior to that time the complete co-operation of the electrical industry will have been pledged to the movement, and from the membership, pledges will have been received to an amount aggregating between $200,000 and $400,000.

The tentative prospectus which follows is prepared showing the work by departments of effort in such a way as to allow for careful analysis and annotation and it is hoped that the various organizations and individuals throughout the electrical industry will lend their co-operation to the committee by forwarding at the earliest possible moment, any additional ideas or suggestions or any definite plans that they may have for the carrying out of the different work as suggested.

THE SUGGESTED PLANS FOLLOW:

Department No. 1. Press Bureau or Publicity Department.

The furnishing of interesting news material for editorial and news space in co-operative newspaper pages.

The furnishing of interesting news material for editorial and news space to central stations for use in local newspapers.

To accumulate and disseminate data, photographs, cuts, etc., for use by prominent writers for articles in newspapers, general magazines, trade papers, etc.

To arrange with writers for articles in periodicals of all classes, including general magazines, newspapers, trade press, etc.

To prevent as far as possible the publication of articles or stories tending to injure the business or work harm to the public.

To assist in the publication or to edit or publish commercial literature of various kinds to architects, builders and other trades.

To prepare and arrange for addresses for architects, builders and various trades, etc.

The keeping in touch with trade publications of such fields and furnishing material directly to each industry.

Furnishing articles and information to other societies and their official organizations.

Furnishing information to National Electric Light Association bulletin, Jovian bulletin and National Electrical Contractor and others, to assist the work of the Society and assist in the dissemination of various publications of a developmental character and the national electrical journals.

Furnishing general stories and news to national newspaper syndicates and locally to members.

Furnishing news and stories which can be transposed and used by members in local papers.

Furnishing news to various magazines and newspapers in an endeavor to unify and improve present water power laws.

Furnishing news to various newspapers and magazines in an endeavor to unify and improve present ordinances and regulations regarding sign wiring, etc.

Stimulation of developmental publications such as are being now prepared by the Commercial Section of the National Electric Light Association, The Rae Co., and other outside publishers, viz.: Modern Industrial Lighting, Electrical Equipment of the Home, Street Lighting, etc., etc. Illuminating Primer of the Electrical Illuminating Society, etc.

Preparation and dissemination of articles on isolated plants thoroughly equipped for electrical service.

Assisting in plan for national publicity and advertising weeks or months on certain phases of electricity.

Accumulation of statistics.

To edit, prepare and disseminate information furnished them by members and other departments for use in articles in trade papers, which will assist in the development of the business.

To disseminate various information to the architectural, building and other trade and farm publications and to co-operate with these allied trades in the furnishing of electrical news of an educational nature.

To prepare stories in the various industries collected on industrial plants which have been completely equipped for electrical service, arranging, if possible, for such equipment in such industries where no such equipment has been made heretofore.

To co-operate with the Jovian Order and with the various other societies and industries in the distribution of publications and booklets, which will assist in the development of the industry.

Preparing and distributing to the electrical press articles regarding the work of the Society which will tend to develop the industry and to increase the membership of the Society.

To prepare and disseminate articles and information which will assist in unification of water power, electrical ordinances, regulations, etc., etc.

To meet with and stimulate the various magazines, newspaper and special writers to the value of electricity as news, and to prepare and disseminate such other information or articles as will tend to develop the electrical business in any way.

No. 2. Advertising Department:

The work of this department will be the handling of all detail in connection with a national advertising campaign in the general magazines, trade and class papers, etc., including the work of devising follow-up systems so that not only will the members of the society secure directly the benefit of the campaign, but so that each dollar spent will return a maximum result. This campaign will be of a broad educational nature, designed to educate and convince the consuming and non-consuming public of the many advantages of electricity for light, heat and power, including special arguments for adequate wiring circuits, outlets, etc.

The department will be further organized to assist central station jobbers, contractors, dealers, etc., as far as possible, in the ways, means and methods of local cooperative or individual advertising campaigns.

This department will collect material from central stations, manufacturers, advertising agencies, etc., and prepare additional material, if necessary, and having this material available, will be in a position to suggest, or perhaps eventually supply advertising or cuts for newspaper advertising, booklets, folders, envelope stuffers, circular letters, etc., to assist members in planning and carrying out advertising campaigns.

To obtain the fullest possible result, this department should also be organized to stimulate the publications of various booklets, similar to those now being published by the Commercial Section of the National Electric Light Association, and by several outside agencies, and publications of a similar character to the Illumination Primer, published by the Illuminating Society. This department could perhaps arrange to publish a monthly bulletin on the work of the society to give the benefit of the work most directly to the members, to secure the cooperation of the members in its work; and where it is not possible to stimulate the publication of aforesaid booklets, to be organized to prepare those which seem necessary.

All such booklets could be used as far as possible in answering direct the inquiries which will come from the national advertising and other sources, and could also be supplied in quantities at a minimum cost to members for local distribution.

In the follow-up system devised, it should be so arranged that each individual member should receive a copy or notification of every inquiry coming from his locality, and the manufacturing members should receive direct copy or notification of every inquiry made at the head or branch office of the society, relating to apparatus which they manufacture.

No. 3. Field Department.

The duties of this department will be chiefly to obtain the cooperation of the various interests in the electrical and allied industries, and effect as far as possible, more harmonious relations and greater cooperation among the interests mentioned; and either by stimulating local endeavor or by carrying out the work direct, this department could take up the following problems both as a local proposition and in connection with the main office work:

Matters of cooperation nationally and locally between the society and the architect, arranging for publicity in architectural journals, and for trained men to speak before architects on electricity.

Cooperative work between the Society for Electrical Development and other societies, arranging for promotion committees, publicity in other society bulletins and organs of various kinds, attendance at local meetings of other societies laying the work of the Society for Electrical Development before them, etc.

Cooperation with the Jovians as a national proposition and among their local leagues to obtain their cooperation in the carrying out of the society's work; suggestion and ideas where requested on various means of cooperation among the different electrical interests and in the various cities locally; the cooperative newspaper page; the matter of electrical ordinances; sign regulations, wiring regulations, etc.; general advice to members on commercial subjects; traveling electrical shows, lectures and demonstrations, moving pictures; perfecting cooperation among the electrical interests and local newspapers, and arranging for a news service from the general office, either through the local central station or direct to the newspaper; in connection with this latter work a great deal can be done in checking adverse publicity; arranging with members, Jovians, etc., for cooperation and appointment of committees where necessary to head off adverse matters such as the card which is now in the Traymore Hotel, Atlantic City, forbidding guests to use electrical appliances, such as hair curlers, etc.

Cooperation locally in the various cities with the Chambers of Commerce, Boards of Trade, etc., for the development of the electrical business and the development of cities. Advice, assistance and dissemination of matters relating to individual and cooperative advertising, merchandising and similar subjects. Arranging for the equipping of various industrial plants locally for electricity to the fullest point of saturation and exchange of information regarding plants so equipped; and arranging for publicity with the publicity department in this matter. Arrangements locally through the Jovian bodies and through the field men for national publicity weeks and other cooperative things of this character. Window displays, stimulation and education of smaller central stations to day load for its effect on country roads, electricity on farms, etc. Arranging for lighting of country roads by street railways, etc. Taking up the matter of traveling demonstration railway cars. Matter of central stations using more electric signs themselves and arranging with the city for electric signs, better street lighting, etc., to develop cities. Arranging for primary courses on electricity in the public schools and working with various schools and colleges.

> It is not the benefits men receive from their country which makes patriots of them, but the sacrifices they make for it.
>
> —HENRY L. DOHERTY.

To a selected list of names Mr. Doherty sent the following letter regarding the work of the Society for Electrical Development:

AS the president of the Society for Electrical Development, I would greatly appreciate anything you may be willing to do to enlist the support of your organization in the work of the society.

We are not lacking work to do, but it is important that we direct our efforts toward the things which are of the greatest good to the industry.

We have just closed a very successful electrical week. The expenses of the society in connection with this week were less than $50,000.

We have received an enormous amount of publicity, with a value many times greater than if an equal amount of space had been given to us for our free use for advertising purposes. In many cases we have been given the entire front cover of many magazines and colored supplements. Nearly all of the national magazines have contributed something to our week—Collier's, Scientific American, Leslie's, Scribners', Farm Machinery and Farm Power, Record and Guide, New West and others have published entire electrical numbers.

While there is no way of estimating the larger value of reading matter and front-page stuff than ordinary advertising space would be worth, it is interesting to note that the value of this space, if calculated merely on the advertising rates of the different publications, would in the aggregate greatly exceed $1,000,000.

When we think that the soap manufacturers, in spite of their large number, and in spite of the per capita consumption of the country being perhaps not much more than 75 cents for soap, can afford to spend vast sums for advertising purposes, we can appreciate the value of this advertising and free publicity, and especially when we remember that the society's expenditure is less than $50,000 for more than $1,000,000 worth of advertising.

We are also endeavoring to bring about intensive cultivation in every city throughout the country. Many central stations do not carry on any "new business" work, although they get a great stimulation to their business from the work carried on in

adjacent cities. In many cases intensive new business campaigns can be started with central stations simply by showing them how to do it.

It is plain to see that if every central station carried on its new business work in the same intensive way as is being done by some all would be benefited.

If a centrally located city like Chicago is spending large sums on newspaper advertising and creating examples of splendid illumination the effect of its work overflows to the surrounding cities. Papers which are bought in the neighboring cities carry the advertisements of the Chicago company. Now, if every city is advertising the same thing; the efforts which flow out from one city are compensated for by the efforts which flow into that city from without.

Another thing we are trying to do which could be greatly assisted by men in the electrical business is to establish an electrical department in each and every trade journal.

It was not until the World's Fair of 1893 that electricity had progressed to a degree of importance which enabled it to have its own building. The last World's Fair held was at San Francisco. In the meantime electricity had generally been applied to so many different arts that it was found impossible to have a special electrical building, because every building was bound to carry electrical exhibits as a portion of the other exhibits.

The Society for Electrical Development has already succeeded in establishing an electrical department in some of the trade journals—and hopes to establish electrical departments in all.

It is needless to point out how much more valuable an electrical department in a trade journal, carrying new, interesting and up-to-date reading matter regarding the application of electricity to that industry, is as compared with the equivalent amount of paid advertising space. It is also well to remember that the paid advertising space would cost perhaps hundreds of thousands of dollars per annum, while by the expenditure of a few thousand dollars, coupled with intelligent work and patience, electrical departments can be established in these trade journals which will go on in perpetuity without further expense to the electrical industry.

We are also trying to get every manufacturer of apparatus which requires power to drive it to catalogue and sell his ma-

chinery equipped with electrical drive and to treat the whole matter as though the natural drive was an electric drive and any other sort of drive an unusual and unnatural form of drive.

We are also trying to lay the foundation for the future fields of great importance which electricity must sooner or later occupy, and especially the matter of electricity on the farm.

Up to the present time the consumption of electricity on the farm where it has been applied, other than the large western farms, has proven rather a disappointment. This is not surprising, as we have not as yet developed the necessary appliances to do all of the farm work, and we will have to develop this business gradually.

On account of the low density of population in the farming districts and the, at present, small use to which electricity can be put there, we think electricity on the farm will have to be developed along rational steps, which are now available to us.

Our plan at present is to cooperate with the automobile associations and endeavor to bring about the lighting of highways. To do this we must perfect systems of highway lighting whereby the direct rays of the light will not be in the eyes of the driver of the automobile, and also by directing the rays from these lamps make highway lighting efficient by having all of the light go onto the road rather than to light up the fields on either side for an equivalent distance.

With a proper system of highway lighting worked out, we think we can carry electricity to the door of many farms, supporting our pole lines entirely from the revenue from highway lighting.

With electricity at the door of many farms, we believe a natural development will take place in which the farmer will eventually become a larger user of electricity—and especially during the period of the year when the central station's load is the lightest. With electricity on the farm the farm may also become a laboratory and a factory, and the farmer can have his own cold storage plant.

We are taking up this farm work very largely because it offers an opportunity for an enormous amount of free publicity, and calls the attention of the public to the general advantages and applications of electricity on the plea that the use of electricity on the farm would mean a substantial contribution to-

ward lowering the cost of food products and contributing to the solution of the problem of the high cost of living.

I do not want to tire you by going into all of the details of the matters we now have under way or the matters we propose to undertake, but I simply want to write a letter like the above to a number of my personal friends to urge them to excite some interest on the part of the men in their own organization regarding the work of the Society for Electrical Development, so we may have the benefit of their suggestions and cooperation in working out the various problems we encounter and movements we inaugurate.

Yours very truly.

HENRY L. DOHERTY.

> Good-will is the most valuable asset on earth. Nations, as well as individuals, are made and unmade by the sheer power of public opinion.
>
> —HENRY L. DOHERTY.

The growth of demand in Europe for American public utility securities is shown by a short article in the Electrical World of November 30, 1912, which says:

HENRY L. DOHERTY, upon his return from abroad on November 22, stated that he had found satisfactory financial conditions in London. One element of the situation which impressed him to a considerable extent was the strong tendency which was apparent abroad toward investment in American securities. He attributed this largely to the Balkan War and the Mexican disorders. Large amounts of foreign capital have been invested in Mexican and South American projects in recent years, Mr. Doherty pointed out, but in view of the various dissensions that have arisen in Mexico, Turkey and elsewhere London financial interests have given more thought to the merits of American securities. He expects to see a considerable growth in this sentiment and looks for a very heavy demand for American securities for investment within a reasonable time. Commenting further, he said, in part: "The investing public abroad is beginning to realize that it is not necessary to confine

its investments to securities that yield a return of not more than 3 or 3½ per cent, in order that it may consider its money safely invested. For that reason the large insurance companies as well as prominent banking interests abroad are investing funds in securities of organizations located in a country which is free from all disturbances. I was agreeably surprised to find that the demand for public utilities securities in London and on the Continent is growing very rapidly. On some of my other visits to London I found more or less skepticism with regard to the investment of foreign capital in public utilities of American organization. On this visit, however, I found that not only were the prominent banks in London greatly interested in public utility stocks and bonds, but the large insurance companies were also agreeably disposed toward the investment of funds in such securities." Mr. Doherty's trip abroad was in connection with the financing of the Utilities Improvement Company, formation of which was noted in these columns October 19.

> Those who do the most for the world's advancement are the ones who demand the least.
>
> —HENRY L. DOHERTY.

A news article, published in many newspapers throughout the country, including the New York financial papers, in December, 1912, said:

NEW YORK.—In an address delivered before a number of financiers in London, Henry L. Doherty of Henry L. Doherty & Co., who has been in England for some time in connection with the organization of a new public utility holding company, discussed the future of gas and electric properties in the United States and Canada.

After explaining the plan of organization of the modern holding corporation for gas and electric properties, Mr. Doherty gave some statistics, which doubtless will be as new to the majority of men interested in these properties on this side of the water as they were to the English financiers. Stating that the real fundamental safety and profitableness of these investments is due to the growth of the country, Mr. Doherty said:

"The average city, apart from one or two areas, is growing at the rate of 3½ per cent each year. This means, roughly, that

the cities double their population every twenty years. Apart from the growth in population, there is a greater growth in the use of gas and electricity, per person, as the city grows in population.

"A town of five thousand population will use only 1,000 cubic feet of gas per capita, and the consumption increases on a per capita basis until, in our larger cities, we have already reached a per capita consumption of 10,000 cubic feet per capita. So, while the growth of our cities averages 3½ per cent per year, the growth of the business, without active stimulation, averages about 7 per cent a year, or the volume of business doubles every ten years.

"However, with the growth of the syndicate plan, a great change has come about in the stimulation of business. In fact, the entire management and operation of these properties is being placed on the same plane of automatic management and operation which has enabled the American organizer, in spite of high labor costs and many other disadvantages, to produce watches, automobiles and many other products on at least a competitive basis with the rest of the world.

"Comprehensive plans for the further development of the uses of gas and electricity are under way. Within the last thirty days the representatives of the electrical supply companies, the machinery manufacturers, the jobbers and dealers, have incorporated the Society of Electrical Development, which proposes to inaugurate a broad national campaign of advertising, to further the application of electricity. A similar movement is on foot among the gas companies."

Don't try merely to see how much you can get out of your men, but rather how much you can make out of your men.

—HENRY L. DOHERTY.

Henry L. Doherty and Frank W. Frueauff

1913

1913

Shortly after the Danbury & Bethel Gas & Electric Company was taken over by the Doherty Organization Mr. Doherty was invited to attend a banquet in his honor given by the Danbury Business Men's Association in February, 1913. No transcript was made of Mr. Doherty's address, but the Danbury News reported the meeting as follows:

HENRY L. DOHERTY, of New York, head of the Utilities Improvement Co., the corporation that controls the Danbury & Bethel Gas & Electric Light Company, and leader in other important public utilities enterprises having interests throughout the country, was the next speaker. It was Mr. Doherty's first appearance in Danbury and his intimate relation to the most important public service corporation doing business in the city and, incidentally, to the city itself and its business interests, made his presence at the dinner a matter of unusual interest. Mr. Doherty made a cleancut address in which he outlined in a general way the policy of his company towards its patrons and the city as a whole. The impression that he made was most favorable and it was evident that he left in the minds of those who heard him the feeling that no harm is likely to come to Danbury by reason of the change that has taken place in the ownership of the local lighting and power plant. He emphasized throughout his address the thought that the interests of the city and those of the public service corporation were identical and that the growth and prosperity of one meant the growth and prosperity of the other. He said that increased consumption of gas and electricity and the resultant increase in the company's business would mean reduction in the prices of both of those commodities as quickly as such a reduction was warranted.

Mr. Doherty is forty-two years old, as his hearers deducted from two statements that he made during his remarks. He might have said very truthfully, had his modesty permitted, that he was one of the youngest men in the United States controlling such a vast amount of capital and business as he does and that at the age of forty-two he has to be regarded as a power and an authority among financiers who specialize in public service properties.

He spoke of himself as a worker and a developer and a man connected with what might be included among the things defined as "big business" but as one having no reason to apologize for the business in which he is engaged. He declared that his whole purpose was to develop and build up the enterprises that he was connected with and in doing so to assist in developing and building up the communities of which his business enterprises were parts.

In beginning his remarks Mr. Doherty said that he was sorry that he had come to Danbury without a prepared address, but he had looked upon his visit to this city as an opportunity to become acquainted with Danbury people rather than an opportunity to talk to them.

"We came up here and looked over things and decided to invite ourselves in," he said, "and now that we are in we are anxious to be as well thought of by you as you are thought of by us. We are interested in this community as we are in all communities in which we own public service properties and we are willing to do all that we can to help build up these communities."

Mr. Doherty said that he was not a scientist in public service matters, nor an efficiency engineer, as he had been asked since he had been seated at the table, "but just a plain engineer who has drifted into the business of buying and operating all sorts of public utility properties. He said that he celebrated only a short time ago his thirtieth year in the business, adding that for fear that he would condemn himself as a man much older than he was, he would say that he started at the early age of twelve years.

He said that he felt that he belonged to the new school of public utility operators, a school that aimed to see how much it could do for a community and at the same time gain a fair

profit upon its investments in public service properties, rather than see how great a rate it could get for its products.

He sketched the evolution of the huge holding corporations from the first combinations of two or three companies owned by local capital and said that the time had come when, by reason of economy of management and operation, the public service corporation that was part of a large combination could give better, cheaper and more efficient service to the community that it served than a company controlled locally could.

"It is one of the efforts that might be termed 'big business' that benefits everybody and injures no one," he said. "You might think that it would be a dangerous thing to come into a community and remove from its gas and electric property the influence of local capital and some of the most influential local men. But we have no such fear. We believe in the fairness of the American people and we have yet to be disappointed. We are operating in a great many communities, considerably over 125 I think, in which about 45 companies are represented. In Danbury, for instance, we have a single company, but we serve two communities, Danbury and Bethel."

Mr. Doherty said that his company had come into Danbury to do business because it had faith in the future of the city, and that the best possible demonstration of that faith was the fact that it had invested its money here. He said that early in his career in his chosen work he had become convinced that to realize the greatest possible success it was necessary to find the communities that were going to grow with greatest rapidity. "Growing communities are always profitable," he added.

At this point Mr. Doherty spoke of the organization and aims of his company. Speaking of its location in Wall Street he said it was there not because he was interested in Wall Street or its stock market, but because Wall Street was the natural center of such business interests. To illustrate his point he said that if he dealt in any requisite of the hat manufacturing industry he probably would locate his business in Danbury, as a center of that industry. And with a man interested in financial business, New York was the natural center in which he would seek business or business would seek him, and Wall Street was the particular part of New York that he would find most advantageous as a business location.

"I happen to be one of those men who are neither for nor against the New York Stock Exchange," he said. "It is a matter of indifference to me. I am neither for nor against the money interests of New York. I have never been inside the Stock Exchange and I have never bought a share of stock on margin. I am in Wall Street but have nothing to do with Wall Street.

"I am going to tell you some of the things we have done to be good citizens in some of the communities we serve."

He told of an incident that occurred in Denver last spring, when the mayor of that city asked his assistance in disposing of some of the civic improvement bonds. The mayor had pledged himself to bring about certain civic betterments during his term of office but had been handicapped in his endeavors to fulfill his pledges by his inability to dispose of the bonds issued for the purpose. Certain requirements of the bonds provided the stumbling block. Mr. Doherty said that he assured the mayor that his company would take the bonds if no other purchaser could be found for them and that he could consider them sold. The amount involved was a large one, but the bonds were taken over by Mr. Doherty and were handled satisfactorily and the civic improvement scheme went through successfully.

He related another incident in which his company went to the aid of a bank in a city in which it had interests. The bank became involved in financial difficulties and Doherty & Company wired that the bank could draw on it for $200,000. The offer was accepted and the bank was tided over its difficulties.

"As the representative of the interests that now own the Danbury & Bethel Gas & Electric Light Company, I am here to tell you that we are willing to do our share toward building up Danbury and Bethel," Mr. Doherty said. "If necessary I will put it in the form of a challenge and tell you that we will do as much as anybody else will do in that direction."

"After several years of investigation," he continued, "I made up my mind that natural resources do not make a city. The thing that does make a city is the right sort of men among its people. And when I say the right sort of men I don't mean the sort of fellows who know how, but never do anything. I mean those who do things. And sometimes you will find that the man who does things does not have time for much else."

Speaking of some of the things accomplished by his company in the way of reducing rates of gas and electricity, he said that a company taken over in a western city was on the verge of bankruptcy. Under the new management its business increased from $700,000 to $3,000,000 in a little over ten years and the cost of gas and electricity to the public was cut in half.

A statement that greatly interested Mr. Doherty's hearers was that Danbury was the first city in New England in which his company had purchased public utilities property. He said that he had been cautious about investing in New England property because of the over-conservative tendency prevailing in many parts of New England. Conservatism and economy carried to too great lengths become a burden and a hindrance rather than a benefit to a community, he said. In this connection he spoke of the value of an attractive appearance as a municipal asset and an aid to progress and prosperity. Many cities of the West owed their remarkable growth, he said, to the open handed policy of their men of wealth and influence, while in New England opposite conditions were too often the case.

"I believe," he said, "that every city should make the best appearance that it can. A good appearance is a paying asset. It is the city that attracts people that grows."

Touching upon the subject of illumination, he said that brilliant lighting was a great aid in making a city attractive and expressed the belief that New York's greatest attraction to its visitors was it Great White Way. "I'm trying to sell lights but not just now," he added.

Mr. Doherty said that he was the first man engaged in the lighting business to establish a new business department in connection with a public service corporation and that he was the first to use newspaper advertising to sell light.

In his concluding sentences Mr. Doherty told how his company had erected electric signs that could be seen from railroads for the purpose of advertising the advantages of cities in which it had business interests, and furnished electricity for such signs without charge. He declared that what his company had done to aid the growth and development of other places it stood ready to do for Danbury.

Mr. Doherty formally assumed office as president of the Society for Electrical Development early in 1913, and at the first meeting at the Engineering Societies Building made the following inaugural address:

E are gathered here to inaugurate the work of the Society for Electrical Development.

We constantly hear the remark made that electricity is in its infancy. This is just one of the usual bromide sayings; and the average man would be puzzled to know how to reply if some one would ask him what was specifically meant by the remark. However, this remark is true when we speak of the application of electricity, but is not true when we speak of the science. Electricity is one of the youngest sciences we have and yet one of the most accurately developed sciences. While the commercial applications of electricity have seemingly been developed with remarkable rapidity, when considered only as an abstract matter, yet it is probably true that the commercial applications of electricity have lagged far behind the development of the science.

The Society for Electricial Development has been formed primarily to bring about the application of electricity on a scale more nearly commensurate with the development of the science. An organization has been formed which is intended to include every branch of electrical work. The board of directors is made up of men chosen from the manufacturers of electrical appliances and equipment, jobbers and dealers in electrical supplies, electrical contractors, and the central station supply companies.

It is planned to raise a fund of not less than $200,000 per year, and as much more as may be possible, to support the work of this society. As yet no effort has been made to solicit subscriptions for this work. A few of those intimately associated with the inauguration of the work have been invited to subscribe, and subscriptions have been received already in excess of $100,000 per year, and I think I am safe in saying that the success of the movement is assured. Before attempting to secure the pledge of either financial or working support for this society, we are inaugurating the work by means of this general conference.

While the officers and directors of the society have tentative plans formed for carrying on the work of the society, yet it is our desire to make these plans as complete and as comprehensive as

possible; and instead of announcing these plans, we have asked many men prominent in the electrical business to meet with us in a two-day session to suggest not only the work the society may do, but also how it can best be done.

The newspapers of our day are filled with columns of matter in opposition to big consolidations of business, and the federal and many of the state governments are busy in the prosecution of the so-called trusts. The consolidation of business operations is, to a certain extent, the natural outcome of progress, which carries economy to the highest possible degree. We are not here to defend the big consolidations, or to say what is a trust and what is not a trust, or what is a good trust and what is a bad trust; but we are endeavoring to establish the benefits of cooperation in a thoroughly lawful manner for the benefit not only of the men engaged in the electrical business, but to the public as well. In all probability no such comprehensive movement of like character has ever been undertaken, and it may be that we will succeed in pointing a way whereby the benefits of big consolidations can be secured in a manner that will bring benefits to everyone and be objectionable to no one.

Speaking in general terms, the progress of civilization can be measured by the extent to which mechanical or electrical power displaces manual labor, and as the work of this society will primarily be to still further displace manual labor by electric power; therefore, disclaiming any sentimentality whatever, we can maintain that the work of this society will result in bringing about a higher degree of civilization.

The work of this society will be along many different lines, and we hope that many valuable suggestions will be made at this conference which will suggest other work to the society or will suggest how to do the work we have laid out, or how better to do this work.

It is anticipated that one branch of the society's work will be to conduct a broad national advertising campaign for the more extended use of electricity—and I fear that some people feel that this is the only work that the society has in mind. This is far from being the case, but it is interesting to note that broad advertising campaigns are carried on and are made to pay handsome profits in spite of the fact that no such opportunities exist as those which are found in the electrical business.

Many of our soap manufacturers find that they can spend immense sums of money every year in advertising, although the possible consumption of soap would probably be far less than one dollar per capita and with several hundred soap manufacturers to supply the country's needs; chewing gum, which sells at five cents a package retail, can command immense funds for advertising; articles which sell for a few cents and have but a meager consumption support expensive advertising campaigns—while as yet no broad, comprehensive national advertising scheme is carried on for electricity and its uses; although the sales value of the current, electrical appliances, electrical apparatus, and all other things electrical can be figured at not less than thirty dollars per capita per annum for our urban population.

It is not my intention to go into extended arguments in this address, but if anybody doubts the possibility of making a national advertising campaign pay handsomely, I think then the question should be brought up for discussion at this conference.

Stories about advertising are numerous, but here is one that came under my own observation. Two young men, both table companions in the same modest western hotel, were discussing advertising; one of these men being at that time of relatively small importance, while the other was of considerable importance. The one of lesser importance had adopted a modest policy of advertising. His rival casually remarked that he wished he had all of the money that had been wasted in advertising—and the quick reply was, that he could have that money, and be welcome to it, if he could have one cent on the dollar of what might be made by judicious advertising. Almost twenty years have since elapsed. The non-advertiser has dropped out of business—in fact, out of sight—while the man who started with a modest advertising campaign is now one of the prominent figures of present business in America.

But advertising is only one of the many means which can be used to bring about a more rapid and extended application of electricity. The great percentage of the people of this country are interested in the applications of electricity from a news standpoint, and one feature of the work of this society will be that of a publicity department—and by the publicity department I mean one where we will attempt to supply to the newspapers and

magazines articles and information about the uses of electricity which will be of interest to their readers, and of equal or greater value than other similar news items in these papers. It is not the intention of this bureau to use any methods except those of legitimate publicity—and by this I mean to use no subterfuge or methods of that character to gain free publicity. In other words, we start out on the principle that we are not going to attempt to "slip anything over" on the editors of the country; and yet we feel that we can promise our supporters that an enormous amount of legitimate free publicity can be secured. In addition to this, we feel that we can frankly say to the editors of the country that we intend to make it our business to find and give out news items regarding the use of electricity and that the progressive publishers of this country will find us a valuable aid and adjunct to their regular staff.

Some work has already been inaugurated by the speaker simply to test out the opportunities for an organization of this character by suggesting to a few central stations and manufacturers the doing of certain work which will bring about a widespread application of electricity. I think I can safely promise that a number of central stations will take certain classes of industries that are now within the reach of their lines and will equip these industries with every possible electrical apparatus which has so far been devised—and will do this work without any support or assistance from this society other than the promise that it will be given widespread publicity. I do not anticipate that the society will have any difficulty in securing descriptive articles for publication in the trade journals that relate to these industries.

Copies of the trade journals containing these articles will be purchased by the Society for Electrical Development and distributed to the various central stations of the country and to the manufacturers of the appliances which are used, and will be used as a basis for getting other similar industries in other cities to install the same extensive electrical equipment. I think all of the manufacturers who deal extensively with the electrical manufacturers and central stations of this country can be relied upon to equip their particular shops and offices with electricity to what might be termed the "last gasp," and these equipments can be written up and distributed in the same way.

I think it is safe to promise that at least two of our central stations will undertake to demonstrate what can be done with electricity on the farm—and the possibilities for the application of electricity on the farm are enormous. The substitution of electric power for manual labor on the farm would do much to solve the much discussed problem of the high cost of living, which relates chiefly to the increased cost of farm products. Through the various government bureaus much help and assistance can be secured, not only in the application of electricity to the farm, but for other applications as well.

With the advent of the motor car many country roads are now used to a greater extent than a portion of the city streets of a few years ago, which, all agreed, were entitled to be liberally lighted. The gradual extension of electric lighting to the public roads will do much in making it possible to carry electricity to the farm economically.

Speaking of the motor car gives me an opportunity, I think, to illustrate by example many of the possibilities of what this organization can accomplish without any expense whatever —or, at least, at an expense far below its real value to the electrical fraternity. There are few people who would look on the gasoline motor car as a possibility for the sale of electrical apparatus—and it is apparent that this is small compared with the general industrial use of electricity or the use of electricity on the farm—and yet after several years of experiment practically all motor car builders agree that electricity is necessary to the gasoline car as a means of starting the engine; and in all probability practically every motor car manufactured in this country will, within a year or two, be equipped with an electric self-starter. This society can do much to rapidly bring about this development.

There were manufactured in this country last year 250,000 motor cars (and we will assume a continued production at this rate) which, if equipped with electric self-starters, will give the manufacturers of batteries, motors, etc., a business of $12,500,000 per year, even though a complete electric self-starter costs but $50 per car; but with the installation of a small electric power plant on the gasoline motor car the opportunity for other uses of electricity on the car becomes enormous. As an example of the work referred to above concerning what this society can

do to induce central stations, manufacturers and others to carry on development work which will be of benefit to the electrical fraternity; I selected a short time ago the manufacturers of one of our well-known makes of motor cars, who I knew to my own personal knowledge had a competent staff of engineers and designers, and asked them if they would not be willing to demonstrate the applications of electricity on the motor car at their own expense and for our benefit. I am in receipt of an affirmative reply from them, and they are already at work on a demonstration car which is to be fitted with various applications of electricity to what I choose to term the "last gasp." In their opinion, the electrical manufacturers may reasonably expect in the near future, depending upon the attention given to this subject, a minimum revenue of not less than $2,000,000 per year and a probable revenue of $10,000,000 per year.

I purposely picked one of the least apparent and, perhaps, one of the smallest opportunities for the application of electricity, and one that lies entirely beyond that of central station service; and yet it is the opinion of men skilled in this business that one of the small activities of this society can bring about a volume of business of not less than $2,000,000 per year, and probably as much as $10,000,000—and certainly this is a good example to warrant us in believing that everybody should be willing to contribute his share towards the modest fund necessary for carrying on the work of this society. While I do not refer to a minimum sum of $200,000 or a maximum of $500,000 as a small sum of money, yet I think we will agree that it is relatively small compared with the possibilities which may be produced by the work of this society.

I could go on giving examples sufficient to take up the time of the whole session, but I do not want to anticipate any further than may be necessary the suggestions which have already been sent in to Mr. Wakeman, or those that may be given at our evening session, for the work of this society and how this work can be done. To avoid the possibility of anticipating any of these suggestions, I have not seen any of those that have been made, nor have I allowed them to be discussed with me.

In closing—

First. I want to impress on your minds that it takes only the most limited intelligence to buy space and spend money on so-

called advertising, but by the application of brains and by stimulating the great number of men in this industry to the highest possible resourcefulness we can accomplish probably more in this way than by the expenditure of money alone.

Second. I want particularly to encourage everyone with a good suggestion to give it to us for discussion at this evening's session.

Third. I maintain that the state of civilization can roughly be measured by the extent to which electrical or mechanical power is substituted for manual labor, and that the work of this society is a work in a practical way towards higher civilization.

Fourth. That we do not want to be called upon to solicit funds from those prominent in the electrical industry, but we want to give them an opportunity to voluntarily join in this work and be pioneers and not trailers.

> A pre-election pledge should disqualify a man for office. His oath of office should come before everything else.
>
> —HENRY L. DOHERTY.

On June 20, 1913, a banquet in honor of Mr. Doherty was given by the people of Denver. The banquet was attended by the Governor of Colorado, the Mayor of Denver, and many other prominent public officials and citizens. Mr. Doherty said:

MR. CHAIRMAN, Governor Ammons and Gentlemen: I don't like to start my speech with an apology, but in justice to what I am going to say, I want to preface my remarks by saying that if I had not been a better engineer than I am a public speaker I would probably never have gotten to Colorado. I feel that this is an opportunity of a lifetime to crystallize some movement for the good of Colorado, and that is the reason why I start with an apology.

I can best, perhaps, illustrate the way I feel by telling that old story of the man from this Western country who went back to see New York. When he landed in New York he said he

was going to have a good dinner. He went down to a prominent restaurant and, unfortunately, the bill of fare was printed in French; he couldn't read French, so he pointed to something on the bill of fare, and the waiter brought him a plate of soup; he ate the soup, and then he pointed to something else on the bill of fare, and he got another plate of soup. After having eaten three or four plates of soup he handed the waiter a dollar and he said, "Waiter, bring me a good dinner." The waiter brought him a big dinner, and he said, "The opportunity of a lifetime, and I am full of soup!"

While I feel that I have the opportunity of a lifetime to crystallize some organized movement for the better prosperity of Colorado and the City of Denver, I feel that I am simply full of notions, without the ability to express them. I am intensely pleased, as you can well imagine from the reception you have given me, and yet I am somewhat embarrassed. I am not used to the social side. I belong to those who get their pleasure from work. I love to work, and I never feel that I can do anything else gracefully. However, I take this reception and I take the fact that you have tendered it to me not as a personal matter, but as a tribute to men of my type; and when I say men of my type, I mean those men who by nature are constructing men, men who want to build; men who, instead of being entirely of the monkey type, have a little bit of the cross of the beaver. We have passed through an important period, and at times men of my type have had great troubles; it has been difficult for them to do what they wanted to do, and I think it has been pretty difficult at times here in Colorado. I feel that these men ought to do what is intended, not for any one man, but for the type of man who is the builder, and to express the fact that there has been a change of sentiment in Colorado and the City of Denver. I hope, and I know, that the whole plan and the sentiment of this meeting is that this will lay the foundation of a great, good and common movement.

I don't know what I am going to say; I have not had an opportunity to prepare a speech; I have made a few notes, which I have before me, and I may follow those notes, or I may not.

I want to preface my remarks by saying that if I say anything in criticism of anybody, it is not intended as criticism. I bear no ill-will to any man in Colorado, and yet I feel that I

have had my own difficulties here, as well as many others. I say this because I am willing to work shoulder to shoulder with any man in Colorado for the building up of Colorado; and if we are going to build up Colorado we need team-work—we cannot have men who cannot contribute to this forward movement.

I want you to remember that if I say anything that seems to reflect criticism, it is not spoken in the spirit of ill-will, but it is spoken for the purpose of laying the foundation to bring prosperity to Colorado. I am willing to accord that to others, even though we have differences of opinion at times. I am one of those peculiar men, and I hope there will be more of them, who perhaps thinks that Andrew Carnegia as the iron-master was a greater philanthropist than Andrew Carnegie, the professional philanthropist. I belong to the type of men who believe they are doing a good work when they are building up an enterprise and furnishing employment to other men. I applaud it in others and I follow that work myself; when I am doing that work I am satisfied. To men who have done their best work I am willing to accord the fact that they have lived their life. I believe my opinion is right, and I believe the men who are builders deserve proper encouragement, and proper encouragement will best serve the public interests. I have had occasion at times to differ from people here. I have had my own interest to represent, and in the classic language of John L. Sullivan—excuse the swear word, but I cannot tell it in any other way—"I fought my damndest; an angel could do no more." What I have done for the people I represent I have done in a whole-hearted way. While I have had no official invitation to represent the people of Denver, or of the State of Colorado, I have had, in the last few years, numerous unofficial invitations to try and do something to stir up greater activity in this community. I have always tried, for the interests with which I have been connected, to do my share towards the building up of Denver and Colorado. We are willing to do our share. We believe we have done it in the past, and we will do all we can in the future. We are not looking for praise; we are simply looking for reasonable encouragement and support. We are more anxious to encourage others to do these things than we are to do them ourselves.

Now, the question is this: What is wrong, and what can be done? I say to you—not to flatter you—that I believe no State in this Union possesses greater opportunities for growth and prosperity than the State of Colorado. I will say something else, that I believe that no State of double or treble the population of Colorado possesses more talent than you can find in this State; and I think no one will question my belief in this question when I tell you that the organization with which I am connected is made up almost entirely of Colorado people—of men that have been trained right in your midst. I maintain another thing: that this State alone, without going beyond its own borders, can raise enough capital to bring it to a state of prosperity, at least equal to any State in the Union. In other words, you possess within your own midst every element necessary for a very, very high degree of prosperity, and you haven't got that degree of prosperity to the extent you should have it. Now, what is the matter? While talking plainly, I believe that the matter is principally due to the fact that this State has been bitten by the same microbe that has bitten the entire nation. I believe we were bitten more severely than in most of the states, and I believe we were bitten a bit earlier; but I believe we are going to be cured earlier, and when we are cured I think the result may be all the better for our having gone through it. The microbe to which I refer is that microbe that is a little bit hard to define, because it has not yet been given a scientific Latin name, or a common English name, but it is the microbe of believing that you can bring about prosperity by passing laws—that you can legislate yourself into prosperity. That same microbe teaches us to believe that the way to get prosperity is to take away from those that have prosperity, instead of creating it; and the only way it can be created is by the creation of new enterprises and the development of resources still undeveloped in this State.

Now, you have got every element here to bring about the prosperity to which I refer—all of these things that would go on the side towards doing these things; but amongst your number—and I attribute not to those men any maliciousness—you have many who cannot be convinced that the thing to do is to grab opportunities. If anybody would start any sort of con-

structive movement in this State, there are men who seem to feel that it is their duty to pull it down. If you will stop and think, one man pulling backwards can do more to hold things still than twenty men pulling forwards. It is like having one horse in a team that pulls back and it is marvelous what that horse can do in preventing the whole team from carrying the load uphill. I have a word of criticism for those people, but I would like to sit down and talk to them, and I think I could convince them that their method would never bring about prosperity to their State; they must be constructive and creative, or at least not exercise their efforts to prevent those who would create and construct.

I don't want to do harm to any other community in which I have interests; but I am going to talk plainly. I attended a Board of Trade banquet in Spokane about a year ago, and I was asked to speak, but I didn't think I had anything to say. After I had listened to some of the other speakers, I made up my mind I did want to say something. I had come to Spokane direct from the Convention of the National Electric Light Association. I had seen in the Spokane papers a very severe criticism on the stand I had taken on the matter of conservation of our natural resources. I don't, as a rule, attempt to reply to criticisms, for if I do it would keep me busy. Many years ago I made up my mind that if the postman stopped to fight it out with every dog on his route he never would get his mail delivered; and so I have allowed repeatedly many unfair criticisms to be said against me, because I had something else to do than to fight against people whose stock in trade was nothing else but fight. I listened to the speakers at this dinner. The first one got up and pointed at the banners around the wall, saying what that inland impire had produced the previous year—I think, twenty-one million dollars of agricultural products. And this speaker went on to say that the inland empire should produce not twenty-one million of produce in one year, but should produce two hundred and eleven million of produce in one year, and said that all it needed, or needed primarily, was proper railroad facilities.

Another speaker got up and spoke about the opportunities that existed in that inland empire, and he, too, took a fall out of the railroads. Another speaker got up and he told about

land that had sold only a few years ago for about a dollar and a half an acre, and that was now worth one thousand dollars an acre; other land sold for three dollars an acre and was now worth a hundred dollars an acre; and he said there was much more land in the inland empire undeveloped that was capable of being brought to the same value; and he, in turn, said, "And the only reason that I haven't developed it more rapidly is because the railroads have refused to anticipate our needs," and with a proper attitude on the part of the railroads all of this could be done.

The last speaker was a man, I suppose, who was probably a merchant, and he got up and told about the fight that Spokane had had with the railroads for twenty years; and he said, "We have won a victory from the railroads after twenty years of fighting," and he said, "We propose twenty years' more fighting, until we get everything we demand. A railroad," he said, "is entitled to a nominal rate of interest on its actual physical property."

I told the toastmaster that I would like to speak and he offered to let me speak. I got up and I said, "Now, gentlemen, I may be more or less in sympathy with your contention regarding the railroads," and I said, "I have no connection with the railroads, and I am not her to advocate the railroads; they have men more able than I in that line of work; but I have a large interest in your community, and we are anxious to see the city grow and prosper, and see our industry grow and prosper, and I am wondering whether the policy pursued in this city and State is to the best interests of your people, and so I start, first, by calling your attention to the article in your morning paper criticizing my attitude on conservation."

In common with your good Governor of the State of Colorado, I have been one of those men who, from the first, have believed that what is meant as conservation under Secretary Pinchot, didn't mean conservation, but land retardation; and I have been outspoken in my belief that it wasn't best for the people, and especially harmful for the Western states. I don't ask people to accept my opinion, and I said to the people in Spokane, at that dinner that night, "I don't believe that conservation is what you want." I said, "The Government has withdrawn nearly thirty-three and a third per cent of the area of

your State; they have made it absolutely unproductive. If you are going to have railroads at all, that thirty-three and a third per cent, if it cannot contribute anything towards the support of a railroad, is an awful load for you to carry; it probably means that you cannot have the railroad facilities you demand. I want to point out that under the policy of conservation, millions of tons of coal are mined in the mountains that might be produced by water, and that now runs idly to the sea. It is a strange thing that a thing so transparent could fool so many people and for so long a time. I am one of those who believes in the old saying of Lincoln, 'You can't fool all the people all the time,' but I am sorry that you can fool so many of them for such a long time."

Life is short. I am going on my forty-third year. I suppose I am young, and yet I look forward to the time when I can no longer help development, and I sometimes wish I could trade a few years off the end of my life so as to pop my head up some fifty years hence and see what they are doing.

Apparently the country seems inclined to follow that man who is the most intolerant of opinion and most intemperate of speech; and I hope the time will come when the people will demand men who are temperate in their speech and judicious in their opinions.

After touching on the matter of conservation—as I say to you, I ask no one to accept my opinion—I then went ahead and analyzed the situation with regard to the railroads. "Here is an empire—a great big empire—within itself, and the one thing it needs for its development is railroads, and with those railroads enormous profits can be reaped on land, and enormous profits can be reaped on this, that and the other thing," and yet they start out on the theory that the railroads will be allowed no profit whatever; and I said, "Gentlemen, I imagine you could induce people to build railroads necessary for the development of this empire, but I am afraid you have narrowed it down so that there are only two classes that will help to build the railroads: one is the fool and the other is the philanthropist; the fool, as a rule, has no money, and the philanthropist prefers not to spend his money in this way. If you cannot induce men to build railroads with the promise that they shall be allowed a profit, while they create enormous funds for

the people, why, I suggest that the only thing to do is to buy the land and let the other fellow who is not yet born build the railroads."

Now, the situation that confronts the State of Washington today—and it, too, is wondering how it can produce greater prosperity—is, in a measure, or perhaps to a greater measure, the same trouble that confronts Colorado. We have tried to legislate ourselves into prosperity. We have written on the statute books of every state limitations to every man who wants to do something, and which I believe serve no good purpose. When I try to do something that I think will benefit everyone, I find on the statute books, placed there by men who were undoubtedly of good intention, laws that make it practically impossible.

I believe that we are on the eve of a newer development for the right type of builder. I am one of those men who perhaps can no longer feel that he is in full sympathy with any class of people. I cannot feel that I belong to any particular class, because my associations and friends belong to every class. I have known what it was to do manual labor. I started out first as an office boy, and have not been in a school since I was twelve years old. My friends are made up of men from every class. My sympathies are with every class, and entirely with no class, because almost every class holds a prejudice in some way against the other class. I think there is no class wholly bad, and there is no class wholly good; nor do I believe that we are going to meet and solve the great problems of this country with an axe. We are not going to meet these complex problems by political economy—I use the word "political" not in the usual sense, but as meaning the general good to the people; we have got to meet them in some way by the earnest thinker and the man who knows his business. I believe a great movement could be organized where every class would attempt to fortify their own class, and I believe they are the only ones that know the inside of that particular class.

I am an optimist; I always have been, and I hope I always will be. I believe the best man in the world can hardly accomplish anything if he does not believe in what he is going to accomplish. While possibly we are influenced to a certain extent, a certain amount is born in us, and we are born either pessimists or optimists.

Now, a word about irrigation and what it means to Colorado: I think you will all give us credit for always trying to conduct our business in a way that is constructive to the city and the state. We have had numerous requests to try and do what we could to bring about a greater prosperity. I have had men who have had occasion to fight me bitterly, and they said, "You ought to do something, and we want you to do something." We looked over the ground and made up our minds that the thing that Colorado needed most was greater agricultural development. And after trying to induce other people to attempt to create land which would produce abundant crops, and failing, then we undertook to do it ourselves. You probably know that irrigation has suffered some from unfortunate experiences, and when I say that I want to testify right here that many men who are severely criticized for the failures in times past—that came about by reason of the fact that, though they tried to do everything they could, they were handicapped, for lack of engineering knowledge, or proper financial resources; and the result was irrigation became a matter of fear on the part of the great investing public; money could not be raised for irrigation enterprises. Our firm undertook to build certain irrigation projects, and we have done this, and have done it from our own capital, and have not asked anybody for a dollar, as we felt we didn't want to do so until success was assured. We do not want to make money in the irrigation business, only enough at this time to demonstrate what could be done, and to encourage others to go ahead. We have confined our efforts to Colorado, and we expect our work will be limited to Colorado as long as there is work to be done here in Colorado.

Now, in a talk that I had with two or three of your very prominent citizens about two years ago, I said, "It seems to me the greatest opportunity for bringing prosperity to Colorado is by the development of your dry lands by irrigation," and I said, "If you can suggest something else that, with the same expenditure of money, will bring greater prosperity to Colorado, we will attempt to do something to solve the problem." After thinking it over, they said, "No."

I spoke a few minutes ago about the builders of the country. I know it has become the fashion with every one to say something critical and something derogatory of one who is at the

head of a corporation, and I am going to tell you a story: When some people got into trouble in Chicago I tried to help get them back on their feet, but I found a non-responsive crowd, and I backed off; but I sat in my room one night thinking of what had happened. Thousands of people had spent their last dollar; they had no water; thousands of people had bonds that had been sold on the very enterprises that were worthless unless the enterprises were completed. I made up my mind that I was not the man to undertake that particular thing, and I made a list of a great number of men that I knew had the ability to put that situation back on its feet, if they only had the confidence of the people; and yet, in one way or another,—and in nineteen cases out of twenty—the confidence of the people had been taken away from the men who might have restored that whole situation and prevented untold suffering. I looked over another class of men in whom the public seemed to have faith, but I could not find anyone that I felt could do anything that was constructive, and could do anything to save the situation, and I reluctantly withdrew and went back, but only after I had asked the Chicago banks to make voluntary subscriptions to put the whole situation on its feet, prevent giving the business enterprises of this country a setback and save these people from suffering.

A word about the builder; a word about New York, and a word about Wall Street. We are spoken of as Colorado people down in New York. We do go from Denver to New York City, not because the Stock Exchange is there, not because the money is there, but because the man with the opportunity, the man with something to finance, is there. Our office is on Wall Street—at 60 Wall Street; we are there because the opportunities come there. I have never been in the New York Stock Exchange; I have never bought a share of stock on margin. The matter of the money condition, the matter that you are so much concerned about—the money trust—is a matter of more or less indifference to us, because our business is almost entirely in the West, and the public has learned to discredit anything that has got the Wall Street stamp on it; and yet you go up and down that street and you will find that the Stock Exchange is a small part of it. Moneyed men are there simply because that is the recognized center from which the opportunities come.

It may interest you to know that over one thousand of our clients are wage earners getting salaries of $150 a month. We hope it always will be that way. There is a reason for that, and it seems a good thing to be frank. For instance, we have recently taken up the Toledo situation. I am glad I can go out any say to the City of Toledo that our clients are largely of the wage-earning class. We think it puts us in a different position.

We want to do all we can to crystallize this movement; I want to do the best thing I can for you. I have no specific suggestions to make just now, but I do believe that if you will get the notion out of your head that you can legislate yourselves into prosperity, it will go a long way.

I am trying to do work in other lines. I want you to know what I am trying to do is this: I am trying to make, for instance, our own men save and invest their money. The great trouble with this country is that, as everybody tells us, the money is in too few hands; but how can it be otherwise, when the great bulk of the people do not do anything in the way of investing or saving their money? Until we can get a distribution of wealth to a greater extent than we have now, we will always have this unrest. There is no use taking the money from the people who have it and giving it to those who haven't it. If they were getting ten times the original amount of their salary, they would have just as much left at the end of every pay-day.

I hope that springing out of this movement will be a great big constructive movement that will originate in Colorado and spread all over the nation.

Mr. Chairman, I thank you.

> Every broadminded employer should not only refrain from revenging himself on labor, but should use all of his influence to prevent others from doing so. Revenge on labor will do nothing but bring us back to a public state of mind that has always prevented a rational determination of the limitation which eventually must be put upon the right of labor.
>
> —HENRY L. DOHERTY.

In the spring of 1913 Mr. Doherty visited England and for a time was a guest of Lord Montagu of Beaulieu. In a conversation on motor fuel, Mr. Doherty expressed some unique views, which so interested Lord Montagu that he invited a number of prominent Englishmen to a dinner, at which Mr. Doherty was asked to deal with the fuel situation as he saw it. In introducing him, Lord Montagu said:

HAVE invited you here to meet Mr. Henry L. Doherty of New York City and to have him repeat to you his views on the petrol problem.

Mr. Doherty is not primarily interested in the problems which confront the motor car fraternity but he is by training and achievement particularly well qualified to speak on this subject.

Mr. Doherty has won a place of distinction in his own country in more than one important line of work. He is the senior member of the banking firm of Henry L. Doherty & Co. of No. 60 Wall Street, New York and his firm is rated by the credit agencies of his own country as second to none on the American continent.

Mr. Doherty is the President or the controlling factor in a large number of business enterprises and amongst other activities controls the corporations which supply gas, electricity and street railway service to over one hundred cities in the United States and Canada.

In addition to his record as a successful financier and business man he also has won distinction as an engineer, a scientist and an inventor. He is the respected member or officer of many of the American scientific societies and of practically all of the engineering societies. He is the ex-President of a dozen or more scientific or engineering societies of the United States including the National Electric Light Association, which is the largest and most powerful electrical society in the world, and is at present the President of both the oldest and youngest electrical society in the United States. He is also the Treasurer of the Inventors' Guild and the New York Academy of Sciences.

It is but rarely that we find an engineer and scientist who is also a man of proven ability in business and financial work and

therefore I think Mr. Doherty may be able to advise how best to proceed to solve the problem of the advancing cost of petrol.

I have the pleasure to introduce to you Mr. Henry L. Doherty.

Mr. Doherty then showed how easily a large amount of motor fuel could be obtained from the gas works, and how gas itself could be used under certain conditions. He said:

THIS dinner is the result of some views I expressed to Lord Montagu and some of his friends on the much discussed petrol problem.

Lord Montagu, with his characteristic interest in the welfare of the motor car industry, volunteered to assemble a group of representative men, if I would repeat to them what I had already said to him.

The time is short and I will have to be brief.

I am not directly interested either in a business way, or by way of a sportsman, in the automobile or the petrol industry. I am, however, familiar with the general conditions surrounding the oil production of my own country, and as an engineer I am generally conversant with the science and practice of thermodynamics, of which the internal combustion engine, which drives the great majority of the motor cars, is an important part.

I have, however, just recently become intensely interested in the petrol problem, as it represents a great economic problem and I am anxious to know how it will be solved.

Possibly I will be able to contribute but little to the solution of this problem, but if I can help to secure a better understanding of one or two points, it will go a long way to stimulate work on the part of others.

An enormous branch of industry is threatened with serious retardation, while the great mass of the people with interests at stake are unconscious of the true conditions.

You hear on all sides the statement made with an assurance that carries conviction, that the scarcity and high price of petrol are due entirely to manipulation. This statement is not true and to permit this impression to exist is retarding the solution of the petrol problem.

Petrol in a sense is a mere byproduct in the production of oil. We have seen the motor car industry grow by leaps and bounds and we have seen no such growth in oil production. One simple way to look at the matter is to remember that if we are now producing enough petrol to supply the demand, what was done with the immense excess production of petrol before the motor car industry assumed its present proportions?

It is my opinion that the present rate of consumption exceeds the production and a large amount of the crude oil in stock has been robbed of its petrol to supply the present demand.

One of my associates recently had a conference with one of the best recognized authorities on oil production in our country and one of the greatest factors in the oil industry in the world, regarding the advisability of incurring a large investment to condense by pressure and refrigeration the oil vapors, which are carried by "casing head" gas. The man that I represent as a great authority said, "Go ahead by all means, for I do not know where the gasoline is to come from to supply the market, and look for the price to double in the next two years."

I am going to try to outline briefly a few suggestions of how the problem can be solved. I think the danger of the situation has not been appreciated and matters have been allowed to drift to a point where it is now unsafe to depend on any one source of relief. If we had a proven method for the manufacture of petrol, I doubt if manufacturing plants could be laid down with sufficient rapidity to avoid a petrol famine that would do serious injury to the motor car business. Not only that but under the prevailing condition of business and finance, it would be almost impossible to finance these undertakings.

There are three broad divisions of how to solve the problem. First, by lessening the demand, second, by increasing the supply, and third, by substituting other fuels.

The increasing price of petrol will tend to lessen its use for purposes other than motor cars, because other agents can often be substituted and steam or producer gas can be substituted for stationary engines, which now use petrol.

Under the head of lessening the demand, the following points are worth considering:

1. The substitution of the steam driven motor car for the petrol engine using heavy oil for fuel under the steam generator.

2. The encouragement of the electric driven vehicle.

Under the head of increasing the supply, the following points are worth considering:

1. The substitution of the less volatile oils by (a) the heating of the oil and the air used in carbureting, (b) the use of carbureters which will ensure complete saturation of the air. (c) by introducing oil as a mist or fog instead of as a vapor, and (d) by using the Brayton rather than the Otto cycle.

2. By the recovery of gasoline from "casing head" gas.

3. By submitting all fuel oils to a cracking process before burning them for fuel purposes.

Under the head of substitution of other fuels, the following points are worth considering:

1. The substitution of (a) compressed, or (b) liquified gas.
2. Wood alcohol.
3. Producer gas.
4. Benzol.

I will not go into the details of what is now being accomplished on small steam engines by the use of high pressure and highly superheated steam, except to say that of my own knowledge, many automobile engineers are unconscious of the high efficiencies that are being secured.

The substitution of steam for some liquid having a higher temperature of condensation commensurate with the condenser temperature attainable in a motor car, would probably yield still greater economy.

Nor will I dwell at length on the use of cars driven by electric accumulators, except to say that they have certain fields of usefulness, where this form of power is highly desirable and the intense fight made on electric vehicles by the makers of some of the gas cars has simply thrown an unnecessary strain on the petrol demand. I will cover the above points in certain broad recommendations.

In regard to the substitution of the less volatile oils, I will treat that subject more in detail. For the sake of simplicity I will divide all internal combustion engines into two classes, class A being those using the Otto cycle and class B those using the Brayton cycle, the distinction being determined by the point of the cycle at which the air and the fuel are brought in contact with each other. Under this classification all cycles

which mix the air and fuel prior to compression being classed, as working on the Otto cycle, and those which bring the fuel and air in contact with each other after compression, will be classed as the Brayton cycle. Class A should be known by the name of its inventor, Beau de Rochat, but it was reduced to commercial practice in the Otto engine, and is known as the Otto cycle. The Brayton cycle, in spite of having possibilities of higher economy and greater reliability, never achieved any commercial prominence except in an amplified form, as used in the Diesel engine.

So far as I know nothing has been used as yet for motor cars but the Otto cycle, and as far as I know nothing but gas fuel or fuel which will vaporize into a gaseous state has been used. In other words, we are depending upon that small faction of oil distillation or other fuels which have that property which enables them to exist either in the state of a liquid or a vapor at atmospheric temperature and pressure. The first natural step for any one who attempts to find a solution to this problem is to propose that liquid fuels be used that have a higher boiling point, and vaporization be secured by the supply of external heat and preferably, in the interest of economy, to use the heat of the waste gases from the engine. Undoubtedly a great deal can be accomplished in this manner to relieve the strain on the petrol market, and especially in cold climates and in conjunction with carbureters that are capable of giving a vapor saturation of 100 per cent. However, we encounter an obstacle here, because during the compression stroke the temperature increases rapidly in logarithmic ratio, and a higher initial temperature means greater and greater likelihood of pre-ignition of the charge, necessitating a lower degree of compression and a lower degree of compression means a lower economy.

Nearly fifteen years ago, when less was known about the internal combustion engine, I tried to study out the causes of pre-ignition, and became convinced that the principal influence was the character of the gas. I finally determined to make my producer gas by using waste flue gas instead of steam for the purpose of lessening the percentage of hydrogen in the gas. I applied for patents on this method of making gas and later demonstrated that in producer gas engine practice, I could

secure not only a greater compression but a greater economy by lessening the hydrogen content in my gas. I also mapped out some work to do on the introduction of a water or oil fog in the charge to enable a higher compression to be reached without premature ignition, but my time for the last few years has been so taken by business and financial matters that I have not had time to follow this up; but this plan of working the Otto cycle gives excellent promise of a method which enables the heavier oils to be used that must be heated to put them in the form of a vapor, and would also tend to increase the compression of the engine and thereby increase both its capacity and economy.

The plan is simple and easily understood. In the compression stroke the relative temperature of the charge tends to increase more rapidly than the relative pressure. Now, if a carbureter is used which not only saturates to 100 per cent, but supersaturates—and by this I mean that it delivers part of the fuel to the engine in the form of a mist or fog, then as compression progresses, the fog becomes a true vapor, taking its latent heat of vaporization from the body of the charge, and thus retarding the temperature rise and lessening the likelihood of pre-ignition.

In the fractional distillation of oil, it is probable that the cut from petrol spirit to the next grade is made at that point which makes it, as we would say in America, "fool proof." In other words, the separation is stopped at a lower temperature than is necessary so as to give a sufficiently volatile oil to work well even with cold cylinders and in the coldest weather and in the least efficient carbureters. While it might not do to group into the motor spirit the next increment of oil that comes over at a higher temperature, yet a series of small cuts could be made and sold at a lower price under a standard name, whereby owners of cars could blend the petrol spirit to the heaviest extent that their conditions would stand. It is difficult to secure a 100 per cent saturation of any gas with any vapor under the same conditions that prevail in a motor car carbureter. How efficient the least efficient of these carbureters are I don't know, but it seems as though the limits in making the motor spirit cut would have to be governed by the least efficient carbureter and the lowest temperatures that would prevail in the conditions of its use.

As to (c) I will state that much work has been done to introduce the fuel suspended as dust or fog and so far without success. While I believe it is easily possible to introduce enough mist or fog to reduce the tendency to pre-ignition, which so far as I know has never been attempted or aimed for, yet if history means anything, the matter of suspending the entire amount of fuel as a dust or a fog is very far from solution. A great deal of work has been done on the use of powdered coal dust in internal combustion engines, but I cannot cite by whom this work was done. There have also been numerous attempts to mist heavy oil and tar, but my memory does not recall anything which I can state regarding these experiments or by whom they were conducted, other than the fact that none of these attempts bore the fruit of success.

Now as to (d) the use of the Brayton cycle. I have no wish to provoke an argument and can ill afford the time for a discussion, much as I would enjoy it, but I maintain that this cycle is inherently better than the Otto cycle and except for the Diesel engine it has, in the language of the card table, been thrown "into the discard." I know that on first thought the majority of engineers will consider me in error in classifying the Diesel engine as simply an amplification of the Brayton cycle. Perhaps I am influenced in my preference for the Brayton cycle by the fact that the originator of this cycle claims the fraternal affection of having spoken my own and only tongue. I will not attempt to go into a comparison of the Otto and Brayton cycles, but in the Brayton cycle as air and fuel are not in contact until combustion is wanted, it is possible to use almost any fuel at any temperature that the material of the engine will stand. I merely wanted to excite the interest of the automobile engineers in this cycle in the belief that their study of it will bear fruit of good flavor. However, I do not expect to see success crown the only commercial application of the Brayton cycle as illustrated in the Diesel engine, nor do I look to see the Brayton cycle developed in time to relieve the acute emergency that now confronts the motor car fraternity. We have not only the acute, but growing, necessity of the motor car industry to deal with, and we cannot permanently go on developing an industry of this magnitude on the mere byproduct of an industry of lesser magnitude. In my country, we manu-

factured over a quarter of a million motor cars last year, and if one were to plot a curve of the increase in motor cars and the use of petrol year by year, in comparison with the production of petrol, and then make any reasonable extensions of these curves to show the relation between demand and supply for the next five or ten years, it would make an impressive picture and a convincing argument that something must be done.

The above does not by any means cover all of the methods for using the oils having a higher boiling temperature, and are only given to stimulate interest. When we turn from the road of using only those fuels which indifferently exist either as a liquid or a vapor, we can turn not only into the path leading to the use of fuels of higher vaporizing temperatures, but also into the opposite path leading to the use of the fuels having lower vapor temperatures. There is not any great quantity of fuel that exists either as a vapor or a liquid at slightly higher pressures or slightly lower temperatures than are furnished by atmospheric conditions. I have already spoken of "casing head gas" and by this term the natural gas that is emitted from oil wells is generally known. Where gas and oil are intimately mixed in, say, a 6 inch well casting, and have to travel together, say, 2,000 feet upward, and from a pressure of, say, 800 to the square inch to a pressure of the atmosphere, you can readily see what an efficient carbureter you have. The light petroleum spirit tends to spring into a vapor and leaves the well with the gas instead of the oil. To condense out this lighter product the gas is compressed and refrigerated; some of the product obtained is too volatile to be suitable to the market, but it could be easily handled under a slight pressure. The fraction that is objectionably volatile is small, while the amount of suitable petrol that can be obtained from casing head gas is probably considerable. In addition to the lighter petroleum spirit that might have to be handled under pressure, we have a large supply of the so-called permanent gases that can either be greatly compressed or compressed to the point where they become a liquid.

Not only this, but we have millions of gallons of heavy oil that are burned every year for steam raising, metallurgical purposes, etc., etc. All of this oil can be first subjected to destructive distillation, and if the process is not carried too far, the remaining liquid product is just as available and valuable as the

original oil for fuel purposes. By subjecting these oils to destructive distillation, we secure some oil which we may term as petrol and a good deal of gas. This gas can be compressed and a large part liquefied.

A large number of experimenters are at work on the problem of how to secure the maximum amount of petrol substitute from oil distillation, and I think so far the best results have been secured by distillation under high pressure.

It is not necessary to go into the matter of compression and liquefication of gases in detail, as any good physicist could give a competent engineering corps enough preliminary instructions to work at will with either compressed or liquefied gas, and any one not familiar with what is being done can look up the Pintsch system of compressed gas, which has been in use for a number of years in railway and marine service, or the Blau or the Wolfe systems or liquefied gas, which have been introduced in the last few years.

All gases can be liquefied with sufficient pressure and a low enough temperature and many gases can be liquefied by pressure alone at atmospheric temperature. However, all gases have what is termed a critical temperature, and above this temperature they will not exist as a liquid regardless of any amount of pressure. Methane (CH_4), generally known as Marsh gas, will not exist as a liquid even at the temperature of the Arctic region, while ethane (C_2H_6), ethylene (C_2H_4) and acetylene (C_2H_2) would not exist as liquids at the higher atmospheric temperatures that exist in New York. The volume of a gas is supposed to be directly in inverse proportion to the pressure. In other words, a thousand cubic feet of gas at atmospheric pressure would only have a volume or bulk at two atmospheres of pressure of 500 cubic feet at 10 atmospheres 100 cubic feet and at 100 atmospheres 10 cubic feet.

This physical property of gas is known as Boyle's or Marriottes' law and is practically correct at moderate pressure, but is very far from correct at extreme pressures. If this law holds good a gas of same density as air would have to be subjected to a pressure of 7,500 per square inch to occupy the same bulk as petrol. However, figuring on a bulk fully proportional to Boyle's law, it would be entirely practical in a city like London to put in compressor stations in connection with the ordinary

gas distributing mains and by a moderate degree of compression supply gas to a compressor tank on the taxicabs and motor buses. One thousand feet of city gas would be equivalent to four British gallons of petrol, so you can see what the saving would be. A tank one square foot in cross section and four feet long filled with town gas at fifty atmospheres of pressure would run a taxicab to exceed ten miles.

It ought easily to be possible to equip a motor bus with enough capacity of pressure tanks to run it from terminal to terminal and by the use of high speed connections, such as used on railway air brakes, the time required for refilling the tanks should be small, say, not to exceed three minutes.

Before leaving the question of liquefied gas it is well to call attention to the fact that certain liquids have the power to dissolve large volumes of gases. For instance, water will absorb practically 500 volumes of ammonia at atmospheric pressure, or, stating it in pounds, one hundred pounds of water will dissolve thirty-three pounds of ammonia gas at atmospheric pressure, sixty-six pounds at two atmospheres, three hundred and thirty pounds at ten atmospheres, etc. Acetone will absorb twenty-five times its own volume of acetylene. So the matter of compression and liquefication of some of our permanent gas may be most easily solved by finding a liquid which will dissolve them.

Another physical phenomena which it is well to keep in mind is the fact that in some cases two or more liquids can be mixed together and the mixture will have a lower boiling point than either or any of the elements. This may prove a solution of how the heavier petrol spirits may be used.

Nobody has succeeded as yet in producing wood alcohol at a price that will compete with petrol, and yet it looks as though this would be easily possible to do. Throughout Canada and the United States you will see immense timber mills with endless conveyors carrying thousands of tons of mill refuse to huge "burners," where it is burned simply to get rid of it and without the recovery of any of the products. It is not difficult to imagine the operation of petrol driven tram cars and even road trucks by means of producer gas. But even after many years of experimentation and earnest effort of development producer gas has not assumed any great proportions even for stationary engine power. The principal difficulties have been the clinker of the

fuel, inability to make a uniform gas, due to the necessity of using water or steam as an endothermic agent, and inability to effectually clean the gas. Probably the use of charcoal for the producer fuel would lessen the difficulties.

But the one promising source of petrol or a petrol substitute is from coal. In our country 500,000,000 tons of coal is used annually. The bulk of this coal should be gasified and might easily be made to yield at least three gallons of motor spirit per ton without lessening the value of the other products.

But as one studies the various possibilities for the production of motor spirit, they must be impressed with the fact that at every turn the motor spirit is a mere by-product, and I speak of a by-product in the sense of a product having a lesser value than the other products necessarily produced. To illustrate by exaggeration you cannot afford to submit fuel oil to a cracking process or carbonize coal for the sake of producing 10 cents' worth of petrol and then throw away 50 cents' worth of gas and $1 worth of coke; and, carrying this example a little farther, you cannot afford to sell your other products except in the highest priced markets. Another crab in the production of motor spirit from coal or other similar process is the fact that the capital required to produce motor spirit by these means is enormous, compared with the value of the petrol product produced.

Destructive distillation, or what seems to be known as the "cracking process" among motor car men, always produces two and sometimes three products besides motor spirit.

With wood we produce, besides alcohol, gas, charcoal, tar and acetic acid. With fuel oil we produce, in addition the motor spirit, gas and heavy oil. With coal we produce, besides motor spirit, gas, coke, tar and ammonia.

For instance, in coke oven practice if we could produce three gallons of motor spirit per ton of coal, this would have a money value of about 12 per cent of the total money value of the other products and a calorific value of about 2 per cent of the other products.

I look on the manufacture of motor spirit from coal as remote, if not impossible, where the primary object is the production of motor spirit. For every million B. t. u. produced as motor spirit you must find a market for fifty million B. t. u. of other products.

Motor spirit until some new discovery is made must continue to be produced as a by-product and the problem is to encourage other manufacturers to produce motor spirit. It seems to me the only logical manufacturers to depend on are the gas manufacturers, for they are the only ones who have a high priced market for one of the principal products which results from every method of making motor spirit. When the first motor cars were designed in America the designers put on a dashboard and whip socket. If the motor car industry had been developed by the old carriage manufacturers the dashboard and whip socket would have probably been retained and no doubt various uses would have been found for the whip. If any one would have dared at some later date to propose the abolishment of the whip there would have been hundreds of people to rise up and protest that the whip was both useful and necessary, perhaps for driving stray cows and other animals off the road.

Now the gas business still has a whip socket and whip. Every year there is sent out with the gas under the streets of the London district approximately twelve million gallons of motor spirit, which is just as unnecessary to a suitable gas supply as a whip socket and whip would be on a modern automobile.

In the early days gas was manufactured solely for illumination, and illumination was due to the presence of hydrocarbon vapors, mainly what we now know is a suitable motor spirit. Laws were enacted regulating the amount of hydrocarbon vapors that should be present by fixing the candlepower of the gas. Testing stations were established and everybody became imbued and everybody has continued to be imbued with the idea that gas is principally an illuminating agent and candlepower is essential. Until during the last three decades illumination was secured by these hydrocarbon vapors. As they would reach the flame and be heated to a high temperature they would break down to hydrogen and free carbon, and the carbon particles during the time they were being burned would be in an incandescent state and would give off light.

Scientists recognized the unscientific nature of a process that depended upon furnishing an incandescent substance that was continually consumed and tried to substitute an indestructible incandescent substance. Of the many and continued efforts none were a success until the epoch making invention of Dr.

Von Welsbach, and this was really only universally successful after years of development work.

Today in the average American city over half of the town gas is sold for fuel purposes, and over 90 per cent of that which is sold for illuminating purposes is used in incandescent lights. Only 2 to 4 per cent is used in open flames, and at least 90 per cent of this should not be. The mantle lamp gives in excess of ten times the illumination of an open flame. The large proportion of the small amount of gas used in the open flame is due to mismanagement or lack of thrift.

This motor spirit contained in town gas is not needed and can easily be removed. In coke oven practice the gas from the ovens is often used simply for fuel, and where this is done the benzol, as it is called, is recovered, which is easily done by simply washing the gas with heavy oil.

What I propose as the most effective and quickest remedy for the petrol problem is the repeal of all laws regarding candle-power requirements on town gas supply, the removal of the benzol vapors by washing with heavy oil, and the sale of this benzol for motor car use. An enormous production is available without much capital outlay, experimentation or delay.

> Don't adopt the policy of crying, "Liar! Liar!"
> —HENRY L. DOHERTY.

Dealing with the same subject of securing motor fuel from gas, Mr. Doherty was requested to present a communication to the British Institution of Gas Engineers, prepared on board ship during his return to the United States:

I DO not know how familiar the men of the gas business are with the conditions that now concern the automobile business. Except for a small percentage of cars that are driven by means of electric accumulators, and a still smaller percentage driven by steam, all motor cars are driven by internal combustion engines working on the Otto cycle and using that small fraction of petroleum which can exist either as a liquid or when mixed with air as a vapor at ordinary temperatures and pressures.

It has not been much more than a decade since the first motor car of this type was built in the United States, and I am told that the United States is now turning out 1,000 motor cars a day. If one were to plot a curve showing the increased production of motor cars, and a curve showing the production of petroleum, it would be easily seen that sooner or later some other source of fuel for motor cars must be found; in fact, the time has probably already been reached when the consumption of motor spirit exceeds the production, and I am also told that present demands are only being supplied by stripping the lighter petroleum products from the crude oil that is carried in stock.

The automobile associations of nearly every country have recognized the seriousness of this situation and have created special committees or organizations to encourage the production of some other form of motor fuel. In the United Kingdom a committee has been formed consisting of representatives from the executive committees of the three principal motoring societies, the Royal Automobile Club, the Society of Motor Manufacturers and Traders and the Automobile Association and Motor Union. Mr. Stenson Cooke, a man of remarkable energy, is the secretary of this committee. This committee has only been in existence for some three months. In some of the other countries organizations of the same character have been in existence for a much longer period of time.

Numerous suggestions, which need not be dealt with here, have been offered as a means of overcoming this threatened fuel famine, either by the manufacture of some substitute product which will have the characteristics of what you call "petrol" here and what we call "gasoline" in America, or by changing the character of the engine driving these cars.

The present type of engine has been worked out to a high state of efficiency, and there is no great promise of success for any other type of engine except after many years of development work.

None of the suggestions received by these committees so far appeal to me as being practical, and practically all of them can be dismissed with the exception of three:

1. The substitution of benzol secured by destructive distillation of coal.

2. The subjection of mineral fuel oils to a cracking process before they are burnt as fuel oils.

3. The use of a compressed gas made from mineral oils.

Of the three suggestions named above, benzol has been found to be an excellent substitute for petrol. A gallon of benzol is heavier than a gallon of petrol, and has about 10 per cent greater heat of combustion—theroetically it should be worth 10 per cent more per gallon than petrol.

I have referred above to the proposal to manufacture motor fuel by cracking fuel oil and after recovering that proportion as a liquid which corresponds to petrol in boiling temperature to then compress the permanent gases and supply and use them in much the same way as Pintsch gas in supplied and used, but for many additional purposes.

This proposal is surrounded with so many commercial difficulties that, aside from its use for trucks and motor buses which have a fixed route of travel, it seems hardly worth serious consideration. While the gases made from oil would be heavier and of much higher calorific value per cubic foot, they would not be as practical as the use of ordinary town gas. The higher density and calorific value of the oil gases would be more than offset by the necessity of building new manufacturing plants and creating new means of distribution, while the use of town gas would require simply the creation of comparatively inexpensive compressor stations in connection with the present distributing systems. The compressor stations could be made to work automatically and be equipped with automatic coin meters.

The motor buses of London are said to use about 15,000,000 gallons of petrol per year. It would require approximately 250 cubic feet of gas to equal a gallon of petrol. Gas is now being handled by one system at pressures of 100 atmospheres. For lack of experience I cannot vouch for the practicability of these high pressures; but even assuming that Boyle's Law holds good at these high pressures, it would only require a tank of one square foot in cross section and five feet long to hold the equivalent of two gallons of petrol. It does not seem impractical to consider town gas for bus fuel, and by equipping taxicabs with a supplemental pressure tank they could be operated very largely on town gas.

The substitution of compressed town gas would not only lessen the consumption of petrol but would also bring about the carbonization of more coal with an additional yield of benzol.

It has been proposed that benzol would be secured by the erection of by-product coke ovens in the place of nonrecovery ovens, and by laying down special plants for the distillation of coal, and especially mine refuse, for the special purpose of making motor car fuel.

A certain amount of motor car fuel is now secured from coke ovens, and at Birchepepod there is a splendid recovery plant which can be seen in operation turning out a highly refined product.

The second suggestion, that of subjecting fuel oil to a mild degree of destructive distillation, known in certain quarters as "cracking," is also promising, because if this cracking process is not carried too far the residual oil is just as valuable for fuel purposes as the original product was. Large quantities of fuel oil are used in engines of the Diesel type, also for metallurgical furnaces and other high temperature furnaces and for steam generation in marine work.

The third proposition in a measure fits in with the second, but it is not necessarily related to the second. It is proposed by cracking fuel oils to produce gases like ethane and ethylene, and use them under high pressure in much the same way as Pintch gas is used.

The demand for petrol in these islands will soon reach an annual consumption of 100,000,000 gallons per year. The price has been increasing to an alarming extent of late, and it is freely predicted by men well informed in the oil business that the price of petrol will double in the next two years. It has already reached a price which is tending to make many motor car manufacturers hesitate about incurring expenditures to enlarge their production.

Prior to my departure from my own country on this trip, my advice was sought by the officers of one of our large automobile manufacturing concerns regarding the advisability of going ahead with their plant for laying down additional facilities for manufacturing trucks.

On a recent visit to the United States of some of my associates in business who are residents of this city, I told them

that sooner or later it was my belief that our gas companies would not be called upon to furnish an illuminating gas, and explained my reasons for this belief.

Upon arrival in this country, I was asked to make a public statement of my reasons for this belief, and on May 14th, at a dinner arranged by Lord Montagu of Beaulieu, I explained the matter to some fifty men interested in the motor car business.

I outlined different methods of relieving the threatened famine of motor spirit, recommending principally that town gas be scrubbed of its benzol, the gas being distributed as a non-luminous gas, and the benzol rectified and sold as motor spirit.

I figured roughly that the gas of the London district alone would supply 12,000,000 gallons of motor spirit per annum, and that the gas of the United Kingdom would supply 60,000,000 gallons of motor spirit. As these quantities were admittedly in excess of anything that had been proposed by other methods, and the only source which might be made available in a reasonable period of time, the suggestion naturally created great interest. I was invited to meet with the Petrol Substitutes Committee and go into the matter at length, which I have since done.

It is interesting to relate that the first motor cars designed in America were designed with a dashboard and whip socket and this is a good illustration of the reluctance shown by many classes of people and many trades to discard old conditions.

If the automobile industry had been left to be developed by the old carriage manufacturers, I can almost imagine that the dashboard and whip socket would have been retained, and small uses would have been found for both which would, in the eyes of many people, have justified their retention.

In a sense, the gas business has undergone a change as radical as the substitution of the engine for the horse, and yet we still retain the dashboard and whip sockets, figuratively speaking.

While the history of gas lighting is known to every gas man, I am inclined to think that this communication may be read with greater interest by the automobile people than by the gas people, and therefore, I venture to say something about illumination.

Illumination at the time of the birth of gas lighting was secured by the burning of hydrocarbons. The hydrocarbon

reached the flame as a gas or a vapor, and when sufficiently highly heated would break down into free hydrogen and solid carbon, the carbon being in the form of lamp black or soot, this carbon would burn to carbonic acid gas, and during the combustion period would be heated to a temperature of incandescence and give off light.

Many scientists realized that this was a very ineffective method of securing illumination, and tried to substitute some indestructible incandescent material—not an incandescent material which would be rapidly consumed. None of these attempts were successful until the epoch making invention of Dr. Auerr von Welsbach, but his incandescent lamp has come into almost universal use.

While there is no accurate way of determining how much gas is burned in the old open flame burners and how much is burned in the incandescent lamps, we figure that in the cities supplied by our various companies, practically only two to four per cent of the entire gas supplied is used in open burners.

As a rule in all of our American cities, more than half of all the gas is sold for fuel purposes. Of the gas used for illumination, we figure that more than ninety per cent is used in incandescent burners. One must remember that there is a great difference in the relative quantity of gas used, and the quantity of gas consumed must not be confused with the number of open burners in relation to the number of incandescent burners, for practically all of the burners that are used for long periods of time such as street lamps and which consume the largest amount of gas are of the incandescent type.

Our organization also thinks that with the present antivibrators and different forms of incandescent burners obtainable, none of the open burners should be used, and that the use of the open burners is due either to mismanagement or lack of thrift.

The United Kingdom, we will say, is paying to foreign countries, $15,000,000 a year for motor fuel which they could supply themselves at a cost approximately not exceeding $5,000,000. The suggestion I have made, however, is not prompted by economy in the sense of getting everything as cheaply as one can but rather in the broader sense that unless some substitute is found for petrol, the price will reach such a point as to threaten the stability of an industry that has grown to enormous propor-

tions, and I maintain that without detriment to the gas consumer, gas can be scrubbed free of its benzol vapor and will be just as valuable to the consumer as the present gas per million B. t. u. of gas furnished. Also that even the user of the open burner will be benefited by being compelled to substitute incandescent burners; but whether this consumer is benefited or not, it hardly seems justified that all of our gas should have illuminating properties simply to accommodate a few people, and for the sake of having illuminating properties in about five per cent of the gas where it is wanted, although not needed.

I believe it is possible for the gas companies of the world to supply motor car fuel for the world. This is not true today, because we are making a large amount of water gas, and even where we are making coal gas, we are trying to make the largest amount of gas, rather than to make at the lowest cost such quantity of gas as would represent a corresponding heat value after credit has been given to an additional by-product, such as motor fuel.

Mr. W. J. Butterfield is my authority for saying that probably 2½ gallons of benzol can be recovered in the United Kingdom under existing methods of carbonization per ton of coal carbonized. The quantities figured in the foregoing, however, are on the assumption that all gas manufactured would be coal gas. If we were to add benzol to our list of by-products, it would probably bring about a change in our carbonization methods, and we would aim to secure that production of benzol which would give us the lowest cost per million B. t. u. for gas.

While benzol is not essential in the gas, it is for some reasons highly objectionable. In the natural gas business in America, where we are dealing with gas free from benzol, we can use rubber in our pipe joints; in natural gas work, we often work at a pressure as much as 400 pounds to the square inch, and have practically no leakage. In artificial gas work, we cannot use the high compression on account of precipitation of the benzol vapor, nor can we use rubber joints because benzol is one of the greatest solvents of rubber known.

If we were working with gas free from benzol vapors, we could then refrigerate our gas at the works for the removal of water vapor, and instead of laying our pipes deep enough in the ground to protect them from frost and condensation, we could

lay them simply deep enough to prevent them from being injured by the traffic. In scrubbing for benzol, we would also eliminate our troubles from naphthalene.

While I do not see any great or immediate profit for the gas companies by scrubbing benzol from gas and selling it for motor spirit, yet I believe it would mark a new epoch in the gas business and indirectly prove a foundation for a gas business in a more magnified scale, beyond the hope of the present gas engineer.

The few gas men with whom I have talked express great doubts as to the possibility of the elimination of the present candle power standards and permission to supply a nonluminous gas.

I have been assured, however, by certain men connected with your Government that they can see no reason why consent to this change should be withheld, and when I cited the statements that had been made to me of the difficulties that had formerly been experienced in the reduction of the candle power standard, the reply was made that there was at that time no good argument for the reduction, such as now exists for the elimination of the standard.

As this also would interest and benefit every user of a motor car, directly or indirectly, it means the help of a large body of influential men, who would be regarded by the public as more or less disinterested, even though their direct interest was known.

However, we as gas men are confronted with this siuation.

The motor car people must have additional fuel. They believe the most likely way of getting this fuel is to secure it from coal or the destructive distillation of fuel oil. In either case, large quantities of gas are produced; in some countries this production would be a possible source of competition, although perhaps not in this country.

It is certain, however, that if the motor car people are to get their fuel at a moderate cost, a market must be found for this gas at the highest price. This market can only be found by using this gas for town distribution and if coal is to be used as a means of getting motor spirit, it means that if the work is attempted aside from the gas companies, the market for coke or fuels of this general character, and the market for tar, will be glutted.

My suggestion is boldly to throw off all standards of illumination, and then go further; instead of having the price of gas based on so many cubic feet, have the price of gas used on a unit of one million B. t. u's. The gas will be measured as hitherto, in cubic feet. It will then be multiplied either by its standard of calorific value or the actual calorific value as determined by recording instruments, and then extended at a definite price per million B. t. u's.

This suggestion is made with the idea of permitting better comparison to be made between different gas supplies and also to enable the calorific standard to be changed from time to time without changing the price. Whatever method is used to supply motor spirit will, until some new discovery is made, probably result in the supply of a large quantity of gas. Dependent upon the production of oil and matters which now we cannot foresee, it will depend on how the gas companies will produce at the lowest cost a suitable gas for all purposes, and yet not necessarily have the same continued calorific value per cubic foot which would bind them to the use of certain materials.

It is my expectation that sooner or later gas will almost completely displace all solid fuel and this is the ideal time to lay the foundation for such a condition.

Before we can hope to supply gas which will take the place of solid fuel, we must adopt a more reasonable method of charging than merely upon the quantity of gas used.

For instance, if we were to attempt to supply gas in the northern parts of the United States for household purposes, including the heating of the house and have no other customers, we should soon be in the position of having say 18 coke ovens running in full blast on the coldest day of the winter as against one in operation on the hottest day of the summer. Even if it were possible to start up and shut down gas generating apparatus at will and without loss, we could not hope to supply gas at a reasonable rate and pay interest on 17 idle coke ovens. Gas companies supply not only a commodity, but a service as well and the price cannot be apportioned solely for the commodity.

It would be idle in a paper of this sort to introduce a rate discussion which we have learned in the electrical business would fill many pages and cover many years, but a word to excite thought on this subject is not out of place here.

Charges must be in relation to the service furnished and equitable charging brings about a lower cost of service and a greater use.

While I do not want to introduce the question of equity of charging, it is one of the things that must be solved before it will be possible to substitute gas generally for solid fuel and to those who are interested in this subject, I would suggest that they look up a paper by your own countryman, Professor John Hopkinson, about 1892, which was published in the electrical papers of that date; this paper is probably the most scholarly paper which has ever been written on this subject. Professor Hopkinson was so far ahead of his time that the paper passed practically unnoticed.

Several other papers have been published, especially in the literature of the National Electric Light Association of America, including a paper in 1900 by the writer entitled "Uniform, Equitable and Competitive Charging," in which the principles of what is known as the "Doherty" method of charging are set out.

This system of charging I still believe to be the one which will have to be adopted by the gas and electrical companies.

The central station electrical business is growing in the United States at a rate which is doubling the business every five years. This growth would have been impossible had they followed the policies of the gas companies of charging a uniform rate per unit of current.

In fact, the growth and prosperity of the electrical business came simultaneously with the adoption of differential methods of charging.

The acute need of differential charges will only be felt by the gas companies when they attempt generally and seriously to substitute gas for solid fuel. I look upon the abolition of candle power standards as the basis for a great expansion of the gas business, but do not believe that this expansion will ever be realized except by the adoption of rational systems of charging which are based on more than one branch of the service. I will close this feature of my communication with the recommendation that the institution could do no better work for the benefit of the gas industry than to inaugurate work at once along this line by the appointment of a suitable committee or commission.

I am writing this communication from aboard ship, so it is impossible to quote figures of statistics and I have therefore tried to avoid the use of all figures. However, some figures cannot well be avoided. Assuming we have a yield of 10,000 cubic feet per ton of coal of gas, having a value of 600 B. t. u. per cubic foot and containing 2.5 gallons of benzole as 22 benzole. This would be approximately 1 per cent by volume of the gas or 100 cubic feet of benzole vapor. If we remove this benzole from our gas we will reduce its quantity by 100 cubic feet, leaving 9,900 cubic feet and its calorific value will be reduced by 409,200 B. t. u., leaving 5,590,800 B. t. u. Our gas will now have a value of but approximately 560 B. t. u. per cubic foot, so we will have to supply the consumer with 10,725 cubic feet of this gas to equal 10,000 cubic feet of the gas which contained the benzole.

I would also suggest that an effort be made to abandon your method of stating calorific value in socalled "Net" terms. There seems to be no good reason for this and many good reasons against. It is confusing to the gas men of our country and must be confusing to all engineers. Coal and other fuel is not figured on this basis. It gives an enormous value when working out the efficiency of apparatus. The gas engineers of our country use the total calorific value as I believe is the custom with all fuel engineers and if it is the opinion of your body that your present method should be retained I would urge that a joint committee be appointed from your body in connection with a similar committee of the gas engineers of our country to bring about the adoption of a uniform standard.

The above is simply a communication and not a paper and is intended simply to introduce a subject for discussion. In view of my inability to attend your meeting I would like to have permission to reply to the discussion by a written communication.

HENRY L. DOHERTY.

God pity this poor old world if every "sucker" was a fool. If that were so, all regular human beings would be fools.

—HENRY L. DOHERTY.

In furthering the work of the Society for Electrical Development, Mr. Doherty made the following address before the 1913 convention of the National Electric Light Association:

I AM not here today with a prepared address, in fact, I have been kept very busy to get here at all, but I am not sorry I am here, although I regret that I arrive on the last day. I have missed but two conventions of this association during a great many years, and it was absolutely unavoidable. This time, in order to get here, I really sailed from Europe before I had finished my work over there, and it may require me to go back. But I am not sorry, because it was worth doing even for the one day, and I am glad to be here and to be with you.

I am here today to talk to you about a new work undertaken outside of the National Electric Light Association, but with its entire cooperation. First, I want to say that for reasons which I can not go into at this time it would be impossible for the association to undertake this work and get the universal cooperation necessary for the movement. As you probably know, the commercial movement in the electrical business is not of very many years' growth. The commercial men have come to the front prominently in the last few years only. You will find as you go back and forth over the country that their work is being carried on in what might be called an intensive way. In a neighboring city, perhaps nothing is being done. Let us assume that the electrical business of the country was entirely owned by one corporation like the Bell Telephone Company. Under those circumstances you could not conceive of intensive work in one city and nothing doing at all in some other city. It would be a hard proposition to stimulate the business in one city and not in another.

Some of you may think that you are free and independent of all other central stations. I might illustrate that you are not by telling you the story of a man who once came to us to sell his plant. We wanted to know why he wished to sell, and he said, "I can not raise the money to put in the apparatus required." We asked, "Are you doing work along the lines of getting new business?" He said, "No; but you see I am pretty close to a big town, and my people go to this big place, and they see a lot of

these things and want them. I cannot find the money to keep on developing my plant." This means that the work which Mr. Insull, for instance, is doing in Chicago, is benefiting stations outside of Chicago. If we are going to bring about the development of this business as rapidly and effectively as we may we want all central stations to cooperate on this question of development. You would be surprised to know how many are doing nothing at all simply because they do not know how to start in and because they need a little encouragement, assistance and advice. The Chicago Edison Company has not seen fit to come out and try to incite these other stations to greater effort, nor is it its province to do so; but the new society can do that class of work and I believe that the work done along that line would contribute very materially to the interest and cooperation which will be given to the National Electric Light Association.

I believe the success of the movement is assured. The degree of success depends upon the cooperation given principally by the men in this room and the interests they represent. I am hoping that you central station men of this country will get together in this movement and will not prove to be trailers, but rather prove to be leaders. Many of the jobbers and contractors who have never spent a dollar in their lives for the promotion of outside work are coming into this movement. I am hoping that the class of people with whom my destinies are cast and about whom I am always ready to brag, will show a progressive spirit and either come in at once or else tell us why they do not believe in the movement. I believe that for every dollar that we collect and expend for our interest as a whole we shall receive in return at least $10 worth of business. When you sum up the amount of apparatus and all the different sorts of electrical equipment sold, you can not figure up that it means less than $30 per capita per year. We know that many soap manufacturers with a possible per capita figure of less than 50 cents per annum spend hundreds of thousands of dollars in promoting. What may we not afford to spend when it means not less than $30 per capita in our business?

However, most of this work does not require a great expenditure of money. It is a question of first studying the situation and then inciting the other fellow and the little fellows to go after new business. I gave one little example when we had

our preliminary meetings, simply to impress one doubtful man. I said to him, "You probably know that self-starters on automobiles are becoming very popular and that in the next year it will be pretty hard to sell an automobile without a starter. What would you say would be a reasonable amount of business to be done with the gasoline motor cars of the country?" He guessed a very small amount, I would not say a foolish guess, because unless you are familiar with the number of motor cars in this country you might do the same; but it may be of use to you to know that the manufacturers of this country are turning out one thousand cars a day. To equip a motor car with a self-starter means that you must put a complete electric power plant in the car. When it is once in the car it is surprising the number of appliances which can be used advantageously with it. I saw a number of motor car people and asked them the different uses to which they thought electricity could be put, and considering all the suggestions with a number of my own, they agreed that they might, in a year, put in enough equipment to collect $50 extra on every motor car.

I am not going to take the time to talk the details of this matter over with you, but I do maintain that just simply by organization, by putting the development of this business into the hands of a society properly organized, financed and managed, a great big success will result for the electrical interests of this country.

I maintain also, and I think this convention has heard me say this before, that we get good will just as soon as we show aggressiveness and progressiveness. This national movement will bring public and general good will to the electrical interests. People will say, "They are hustlers!" That will bring good will and a disposition on the part of the public to treat central station interests fairly. We have made a great mistake in not attempting something of this sort sooner.

The development of the electrical business is bound to go on. If we leave it as it is going on now, a comparatively few of us will have to do all the work, spend all the money and carry the entire load. If we create, as it is possible to create, some sort of plan whereby the other fellow, the little fellow, can come in, he will do so. Those who are not doing anything at all now, simply because they have not known how, will come in and do something. Give them a way and they will follow it.

I do not want to hold up this meeting, Mr. President, but I do want to urge the central station men again to get into this movement. Catch the spirit of cooperation, and to those of you who have faith in my predictions and work along this line I promise you shall not regret it.

> If any man has got some kind of a job he has to do he will probably do it about the same way some other man would do it.
>
> —HENRY L. DOHERTY.

In the Thousand Islands of the St. Lawrence River the National Electric Lamp Association established a camp for recreation of its employes and executives. It was called Association Island and for years was the Mecca of electrical men. Some of the most important conferences in the history of the electrical industry were held at Association Island, and invitations to partake of its hospitality were eagerly sought. At one of the conferences, participated in by leaders in the industry, as well as government officials occupying high positions, Mr. Doherty made the following address in 1913 on the work of the Society for Electrical Development:

MR. CHAIRMAN and Gentlemen: I don't want by any chance to have the Society for Electrical Development appear in any other light than what it is, and that is the light of friendly cooperation between the various interests that make up the whole electrical fraternity. But I do want to draw a certain comparison to make plain a point that has been in the minds of many of us. The electrical business today is in the hands of thousands of differently owned organizations—partnerships, corporations, individuals and what not. These people are again divided, more or less, because some supply central station service, some supply machinery for central stations, some equipment for consumers, some do the wiring work, and we have an enormous number of people interested in the electrical business. We have today no plan by which

these people can cooperate, nor did any society exist previous to the formation of the Society for Electrical Development, where all these people could contribute. There is no one society where they are eligible for membership. This is such a society. Somebody referred this morning to the influence of the mail-order houses. To the extent that they handle electrical apparatus and supplies, they are eligible for membership, and I have no doubt we will get many subscriptions of that sort.

What I started out to do is to contrast the way the business is now conducted in the hands of these many thousands of people, as against the way it would be conducted if it were all owned by one enterprise. To-day we find methods of intensive cultivation used in this city and that city, while perhaps one hundred, or fifty or five miles away nothing at all is being done. If we could bring about the intensive cultivation of the electrical interests in the different cities we would accomplish a great deal for the development and application of electricity. It is a work that none of us need feel ashamed of, and a work which we can all feel proud of, because roughly you can measure the advance of civilization by the extent to which you eliminate human labor and substitute mechanical labor for it. There is practically nothing that is done now that is laborious to the human workman that could not partially or entirely be done by mechanical energy transmitted by means of electricity. Doctor Steinmetz gave an example that has sometimes bothered me to express, and that is, we seldom use electrical energy as such, but first transform it into some other form of energy. But electricity has given us the means of transmitting power divisible into small units without any objectionable by-products, and as I walk along the streets every day I see work that is laborious, and is done by human effort, which might be done by mechanical energy which could easily be supplied by electrical energy.

Now, it is not possible or desirable, even if the laws of our country permitted it, for the entire electrical business of the country to be in the hands of one concern. But we can form some broad, comprehensive plan whereby we can all cooperate to bring about the greatest possible development, and that is what we are trying to do in the present organization. We now have subscriptions amounting to over $135,000, and we know that many other subscriptions are in the hands of the Jovian

Order that we have not yet heard from. Our membership already exceeds 400, we have no doubt of reaching the minimum number of 4,000, we expect to greatly exceed it, and we expect to get a large number of these people who have never done anything to come in and help with this movement. I have no doubt there are many people who have heretofore done nothing and have no means of doing anything and this organization has enabled us to get them in.

As you probably know, the Jovian Order is now an organization 13,000 strong, and among others it includes practically every able electrical salesman in the country. We have the hearty support of that organization, and they are out now and have been for three weeks in the effort to bring in subscriptions above the $200,000 mark. We expect to work in harmony with that organization and expect them to be a great factor in this work.

We are also working in closest harmony with the Commercial Section of the National Electric Light Association, which, as you know, embraces almost every clever and able new business man connected with all the central stations in the United States, together with the new business men and advertising men of the various manufacturers.

We believe that, intelligently expended, one dollar will bring returns to the industry as a whole of at least ten dollars. We have already gotten over the troublesome point of how to adjust the assessment against the various interests. That seemed to be one of the difficult points, but we have all agreed upon it; and even if the assessment is not strictly equitable, we feel certain that everybody will get returns much greater than the amount they pay in toward the work of the society.

We believe that an enormous amount of work can be done without any expense whatever, or merely nominal expense, and yet it will bring large returns. We believe that heretofore there has been no society which could properly cooperate with other organizations, such as the architects and the various other trade organizations along that line, all of which have conventions that meet once a year and have active committees working throughout the year. We believe we will, by working with those organizations, be able to do a great deal toward bringing about the broader application of electricity, without any expense to

our society, or at least with only nominal expense, and I think you will all agree that that is a reasonable expectation. We think that heretofore there has been no organization which has been completely effective in working together with the national advertisers. We expect to be able to work with the national advertisers to bring about a greater use of electric sign advertising, and things of that kind, and stimulate the business, and stimulate it enormously.

I can't talk with the same aggressiveness on this particular subject as I could on some other subject, because it seems to me that the problems of getting together, cooperating to try to harmonize and bring about active development and work of this sort should be so apparent and so unquestionably beneficial to the entire industry that I almost feel it is not worth while to debate it—I can't get up aggressiveness in debating a subject when it seems to me unanswerable.

I was greatly interested this morning in the address of Mr. Fish and the address of Mr. Vanderlip, and there were some things which came up in connection with both that have a bearing on our work. There was one thing that appealed to me particularly in Mr. Vanderlip's address. Mr. Vanderlip spoke about the enormous amount of money this industry would demand for the next four or five years. His figures and mine don't differ materially. I have made the statement that even in the poorest year it is necessary for the public utilities of America to raise at least $300,000,000 or $1,000,000 a day for every working day in the year. Now I can see, on reading these figures to some of the members in the room, they would wonder where in the world the money was coming from to provide for this business and this business alone. I have had some experience with many of the men in this room, in a financial way, and it has been instructive to me to see how some of them look at it. The money wealth of this country is, roughly—and I don't attach any accuracy to these figures, because my business is primarily that of an engineer—the money wealth of this country is approximately $3,700,000,000. Of that money wealth about $350,000,000 is tied up absolutely in government money that is not on deposit in the national banks, reducing our national wealth to $3,350,000,000, of which it requires about a billion dollars to maintain our national bank reserves, leaving $2,350,000,000 to

transact the business of this country. If you will look at the bank reports it will appear that our legal reserves are about $1,400,000,000, but the other $400,000,000 is devoted to cross deposits.

Now, I want to remind you that every year we not only carry on the enormous business of this country, the railroad investments and everything of that sort, but in addition to that we move $10,000,000,000 worth of farm products, with $2,350,000,000 of money, and various students of political economy will tell you that the farm products move through three hands—and from that up to ten hands. I don't want anybody to get the notion that merely because we need $300,000,000 a year to finance the public utilities, that that means any great drain on our money resources.

There was another point in Mr. Vanderlip's address that would have considerable bearing on this work. We all know that we have been passing through an evolution in matters of investment that amounts to little less than a revolution. We have seen in fifteen years New York City bonds sell on a 2.65 per cent earning basis, as against selling now on practically a 4.5 per cent earning basis. We have seen the rate of returns advance 70 per cent. And taking British consols as an example, we have seen the market value of certain gilt-edged securities shrink 40 per cent. In other words, the rental value of capital has gone up enormously in the past few years. That has had a bearing on the electrical business the same as on every other business, and it is going to be a great problem how some lines of business can meet this enormous increase in the rental value of capital, and while those in the public utilities may look on it with some apprehension, surely they have less reason than those in almost any other line of business. We are in a line of business where we still have an enormous margin between our selling price and our manufacturing price. I, for one, don't know how some lines of business are going to meet this problem of the increased rental value of capital, but to me it is not difficult to see how the electrical business can do it, because it has opportunities which other businesses do not hold. There has never been a time when work of this sort could be more effectively done than at this time. We have laid the foundation, we have developed many devices and have recently brought about many

improvements that simply mean doing in other places what has already been successfully done somewhere else. In other words, a great deal is available to us to accomplish here, there and everywhere, which is beyond the experimental stage and is in a thoroughly demonstrative state. It is a simple matter, with the capital, with the proper salesmen, with the proper men to install it, to convince the investor that an enormously greater revenue is awaiting him. We do know that in the central station business, in fact in every branch of the electrical business, that as we increase our volume of business we increase our profits more than proportionately. And there is every reason why, in the face of these various things, this movement should be undertaken and at this time. There is a great deal more that I might say as argument why this work should be undertaken and why it should receive the cordial support of the entire electrical industry, but, as I said before, it seems to me unanswerable that it should be done, and instead of taking all the time that has been allotted to us—and I think the chairman said that if necessary he would give us an hour and a half—instead of trying to take all your time I would like to see the remaining time left for discussion by those who are interested in the subject.

I would like to close with one point that I didn't cover. I don't want Mr. Vanderlip to think that I am quarrelling with his paper, because I am not, and I am one of the men that feel like taking off my hat to him for that paper. I am merely supplementing some of the things he said in that paper, and I thank Mr. Vanderlip for being able to quote figures in that paper that I didn't know myself. But here is something that may interest everybody in this room. In the first place, I celebrated my thirteith year in the public utility business last October, and during that time I have learned a good many things, as the burnt child learns not to put his fingers back in the fire. I am in the class in this business with a great many men, and I refer to the remark made by Mr. Vanderlip about the dreams of the promoter and the dreams of the man who is founding an enterprise. I know of no other line of work where the representations of the promoter haven't been enormously discounted. I can bear out from my own personal experience that predictions made by men in this business have never been as great as the results, and I want to point to one thing as an example, and that

is to the various bond issues that have been made on these various properties. Trace the history of the bond issues that have been authorized on gas and electricity, and especially electricity, and you will find no man who ever put together one of these corporations, until in recent years, and as yet we haven't the proof of that, ever provided a proper amount in authorized bonds, nor do I know of a single case of a company that has been aggressively and well managed, where the earnings haven't exceeded the predictions over a long term of years. For a great many years I was connected with Emerson McMillin and Company, when they were the most active house in this work. We never made a bond issue that was big enough, and there never was a case where earnings didn't exceed our figures over a long period of years. About five or six years ago, or perhaps longer, to be exact it was in 1907, associated with other people we wanted to issue bonds on a certain city, and we wanted at that time to sell a million and a half of bonds. One of my associates negotiated the sale of these bonds with a certain bond house, leaving the one item that I considered of greatest importance to be determined later by mutual agreement. These mutual agreements are all right when you are trying to hold the other fellow down, but all wrong when you are trying to boost the other fellow up. When I found out that the agreement had been closed in that way, I went over to the bond house and said, "One important matter has not been attended to, and that is the proper authorized issue of bonds for this property." I said, "We want an authorized issue of $18,000,000." But they said, "That is absurd." I said, "What do you think it ought to be?" "We would say about $3,-000,000." I said, "How do you figure it?" Well, it turned out that they hadn't figured it at all, and I doubt if any one up to that time had ever attempted to figure what the authorized issue of bonds should be to carry the company through the life of the mortgage. I said, "Perhaps you would be interested in my figures," and I showed them that that property would need during the life of that mortgage $18,000,000, and I had based my figures on the average growth of American cities of that size for the past thirty years, assuming that that growth would be maintained. I assumed that we would have a business only equal, on a per capita basis, to what was already being done, and that our investment would be four dollars for every dollar of

increased annual business, which figured out that we needed an $18,000,000 bond issue. So after a great deal of talk back and forth they finally agreed to let us have an authorized bond issue of $10,000,000. I mention that simply as an example, for you people realize what it means in a city growing at the rate of 3½ per cent a year, which means that our American cities double every twenty years. Our consumption of electricity increases on a per capita basis rapidly as the city grows; that is, while a small city will only use one dollar's worth of current per capita, a big city will use ten dollars' worth. Then comes in this factor of stimulation, which has been going on for the past few years, added to these other factors, and I think once we have gotten down to normal or whatever our industrial condition will be after this crisis is over, we will find that all our electrical properties are intrinsically sound and they will make even more money than we have predicted. And I think that the truth of this will have a great effect in getting your four out of five investors that Mr. Vanderlip has spoken of. I think they will find that the electrical business will have the ability to meet the situation which many other industries have not, and if they have money to invest they will find the ideal investment is the electrical investment.

> In a country like this there is no necessity for poverty. Behind nearly every case of poverty is our "National Folly"—lack of thrift.
>
> —HENRY L. DOHERTY.

In the summer of 1913 Mr. Doherty was asked by the Electrical World to prepare a short article on the Society for Electrical Devolpment. He wrote:

LECTRICAL development has brought forward many arguments to show the advantages obtained from membership in this society, several of which are given below.

This society makes it possible for all to cooperate and contribute toward the more rapid development of the electrical business. No such organization has heretofore existed. Without any particular solicitation, many subscriptions have already been received from those who have

heretofore subscribed nothing toward such a movement simply because there was no way for them to do so. The society provides the way to accomplish results vitally important to every one connected with the electrical industry.

The society will bring about a more general intensified cultivation of the market. As matters now stand, a few central stations and a few manufacturing companies are endeavoring to carry on intensified cultivation of their markets, while many other central stations and many other manufacturers are doing little or nothing. The benefits of intensive cultivation can no longer be questioned, and without any particular expense to the society, many who are not now carrying on an intensive cultivation of their markets can be induced to do so; some need only to be told how to proceed.

Enough work has already been done to demonstrate that many manufacturing plants can be induced to make complete installations of electrical equipment; that is, they can be induced to use electricity in every way possible simply for the advertising that each individual factory will receive from being the first one to be equipped completely. With any one type of factory equipped completely and thoroughly described in a proper bulletin, each central station having the same character of factory on its lines can easily get this additional business with a minimum sales effort.

The Society for Electrical Development provides the only place where it is really feasible for every branch of the electrical business to meet on common ground to bring about the greatest application for electricity. In other words, it is the focal point at which the manufacturers' associations, the central station associations, the contractors' associations, the jobbers' associations and others can meet and cooperate.

The society can undertake to handle national advertising campaigns more effectively than any other organization, because it will represent all the interests necessary to make such work productive and valuable.

The electrification of our steam railroads is not as remote as it seems to many people, and yet little is being done with this vast opportunity compared to what might be done. The Society for Electrical Development will exert a powerful influence for progress in this direction.

The society can meet, negotiate and cooperate with other national bodies, such as the architects and the various manufacturers. This would be impossible for an individual or a company. This one field of work alone, intelligently and aggressively handled under the society's plans, justifies the support required by the society.

The society will begin its activities in every branch when a minimum subscription of $200,000 has been received. It is impossible to visit every one personally. The men in the electrical business, as a rule, have been pioneers and not trailers. The genuine progressive spirit which has made the electrical industry what it is today can be shown by promptly volunteering to cooperate.

Strive not to be a dissatisfied employe. If you are one, there is something wrong with the boss or with the concern you work for, or with yourself. If the trouble is with the concern or the boss, the sooner you leave them the better. If the trouble is with yourself, the sooner you find it out the better.

—HENRY L. DOHERTY

1914

One of Elbert Hubbard's most widely read articles was written after a visit with Mr. Doherty in Toledo. It was entitled "Public Utilities," and explained in simple words the function of the public service company and its relation to community growth. Incidentally it paid a high tribute to Mr. Doherty and the Doherty organization. Mr. Hubbard wrote:

PUBLIC utility is a company or corporation that undertakes to do for a city what individual effort could not compass.

Public utilities supply light, heat, power, water, gas, transportation.

Usually a public utility that supplies electricity also owns and operates the street-railway system, for the simple reason that the concern aims to use its own current, and an electric street-car line is a method of marketing the "juice."

One big feature of selling electricity has now manifested itself in the many electric signs that are seen in all of the prominent cities.

It is one thing to build a railroad and another thing to operate it. It is one thing to organize a public utility and another thing to run it.

It used to be an axiom that the builders of a railroad always went broke in the operation, and someone else had to come on the scene and take charge of the property, rejuvenate it, reorganize, put in fresh blood, in order that the whole thing might be galvanized into life.

Most of the electric light companies in the thousands of towns and cities over America were organized with local capital, and in the majority of instances the venture was a losing one for every one concerned.

One thing, the equipment was usually found to be obsolete in the course of a few years, so rapidly have new inventions, new ideas, come in. Economy in construction was carried beyond the point of diminishing returns. The fact that the scheme was not a financial success discouraged all local investors from putting in any more money.

The Expert

Then comes the public utility expert and buys the property.

For instance, the firm of Henry L. Doherty and Company of New York own and operate public utilities in about one hundred towns and cities in America.

There seems to be an opinion in some circles that Doherty takes money out of a town. The curious thing is that Doherty makes money for himself by putting more money into the town far than he takes out.

For instance, in the city of Toledo, where Doherty took over the Railways and Light Company, he is planning to purchase one hundred new steel cars of the very latest construction at a cost of five thousand dollars each. Here is five hundred thousand dollars straight.

It will require additional men to man and care for these cars, thus making a greatly increased payroll.

Five hundred thousand dollars more will be expended in extending lines, in lengthening sidings, double-tracking, putting in heavier steel, increasing the capacity of central plants. Easily a million and a half dollars will be spent in two years. This money is all outside capital. Also, it does not come from Wall Street.

Doherty has a clientele of about ten thousand small investors scattered all over the United States. Everything that Doherty takes hold of prospers, and his investors are educated into the idea that anything that Doherty recommends is a sure and safe investment.

These investors are not speculators, bounders nor gamblers. They are plain people who seek a safe investment and a fair dividend.

The intent of Doherty in every instance is to increase the consumption of the current, and he does this through sales departments that go into the town and suggest ways and means whereby an increased use of the current is brought about.

A few years ago the incandescent lamp was used to light houses and stores. Now in every city there is more of the juice used for advertising purposes than for interior consumption. For instance, most of the big stores in the cities close at six o'clock at night. Thus the consumption of electricity for store purposes is limited to a very few hours.

However, these same stores often maintain big electric signs that operate until one o'clock in the morning. Thus the central plant gets what it calls a "long haul."

A storekeeper will pay out fifty, one hundred or two hundred dollars a month for electric lights to run his signs, when he would kick on a fifteen-dollar bill for lighting his home.

The diversity, ingenuity and genius brought to bear in constructing these signs is a new thing in business.

Toledo has one sign that requires seven thousand bulbs, and there is a building in Denver that is lighted on the outside by fifteen thousand bulbs, all purely for decorative and advertising purposes.

When a man who runs a central plant can double the production of his current, he more than doubles his net income. The cost of electricity decreases rapidly in proportion to the amount of the current produced, and it has been ascertained beyond argument that the best lighted cities are those where most business is done.

Light stands for literature. The words have a common root. Literature tokens intelligence, and intelligence mirrors enterprise, thrift, industrialism. Business at the last is largely a matter of sentiment. The light seems to give courage, hope, animation and binds people together into a common bond.

Public Partnerships

The men who manage big public utilities now everywhere realize the necessity of going in partnership with the people. A public utility thrives only as it is backed up by the best people in the town. A public utility stands for permanence. It is always a booster. It joins hands with everybody who is in a good business, and the financial advantages that it enjoys over any local concern put it in a position where it can render a great, important service to the community. It siphons capital from a thousand towns and cities and centers it in places where it will do the most good.

I have visited a great many of the Doherty towns and have noticed that through a betterment of the service by putting vast sums into the town in the way of improvements and betterments they have given courage to every local venture.

It is a new infusion of blood that gives increased life and vitality to the whole business community.

The Doherty Idea

Henry L. Doherty was born in Columbus, Ohio, forty-four years ago. His father died when he was twelve years of age, and the lad went to work earning his own living and helping support his mother and a brood of brothers and sisters. He was errand boy, clerk, secretary, salesmanager, engineer, in the gas industry, and then drifted into electric-light work. He made the discovery that most public utilities are run on a very parsimonious basis, and that no public utility can be run properly with local capital and with local management.

He was appointed receiver of a run-down, busted-up plant, went out and secured new customers for the current, convinced a few of his friends that the business could be made to pay, and they having faith in him put their money into the venture. He pulled the whole thing through in a big way and put it on a paying basis.

And this same policy that won out in one instance has been applied to his hundred and more public utilities.

Anybody who deals with Doherty thrives, because he thrives only as the community thrives in which he operates. He goes into partnership with the public.

While Doherty is not exactly on his uppers, yet he is not wallowing in wealth any to speak of. He controls two hundred million dollars' worth of property. But his enterprises are all in the borrowing stage. Doherty puts them in position where they are able to pay interest on bonds and a small, sure dividend to stockholders.

And this from a business standpoint is success.

But as for Doherty taking money out of a community by means of a public utility, please disentangle it from your memory and give your forgettery a chance.

The modern public utility policy is, put money into a town, not take it out. And here we get another instance where big business benefits everybody.

A paper prepared by Mr. Doherty in 1914 on the holding company and its function in public utility operation and management gives some interesting information regarding the history and growth of the country's gas and electric business. He said:

HE history of all business endeavor has been one, on the whole, of enormous over estimates and numerous disappointments.

It may be interesting to call attention to the fact that the public utility business has been one not of over estimates but of enormous under estimates. This can be proven in many ways, but especially by the fact that practically no public utility enterprise has yet been financed on a scale of magnitude which has taken care of the growth of that business throughout the life of the mortgage; or even for a large portion of the life of the mortgage. In other words, even the most imaginary and optimistic promoter has failed to appreciate the growth of this form of business over a long period of years—and it still remains to be proven that the present greater expansion of our ideas as to the financial foundation of these enterprises will prove adequate.

There is a reason for this growth of business which is perhaps not hard to explain. Our American cities on an average are growing at a rate of 2.85 per cent each year, which means that they double in population every 25 years. For the past two decades our cities have been growing at a general average rate of 2.86 per cent. The magnitude of the effect of compound interest is seldom appreciated by anyone, nor the effect of numbers due to compounding percentages.

In addition to this, the growth of sales of a gas or electric company increases on a per capita basis with the increased growth of a city. For instance, a city of 10,000 population will probably use not to exceed 1,000 cubic feet of gas per capita per year, while a city of 1,000,000 people will use perhaps as much as 10,000 cubic feet of gas per capita. Also new uses are constantly being found for both gas and electricity. New appliances for their use are constantly being put on the market, and the consumption of gas or current in any given city on a per capita basis tends to be augmented each year by the creation of new uses and the creation of new appliances and new applications.

It has also become customary for each gas and electric company to have what is termed a New Business Department, and during the past few years the majority of all the gas and electric companies have resorted to what might be termed intensive cultivation. This effort along the line of intensive cultivation has yielded handsome returns, and the tendency is for greater and greater efforts to be made in this direction.

The increased growth of cities, the larger use of gas and electricity as a city grows, the larger use per person of gas and electricity as the city grows, together with the efforts for intensive cultivation, has brought an enormous growth to this business in the last few years.

If the growth of the business was only equal to the growth of the city it would mean a growth of 2.85 per year, or the doubling of the business every 25 years; but it is figured that the increased use per person in addition to the growth of the city means—for instance for an electric company—that the business, without intensive cultivation, will double every 10 years, and that these factors in connection with the intensive cultivation of the business means that the business will double every 5 years. It is probably safe to say that no other business of great magnitude is growing at anything like the pace of the public utility business as a whole—and the electric branch of the public utility business is the most marked example.

It may be well to explain here what is meant by the term "public utility," for while the term is known to many people, for reasons which have surrounded the business, and which are not thoroughly appreciated, the growth of this business has greatly exceeded the state of popular education. In a broad sense the term "public utility" may be taken to include all manner of corporate service to the public; but in the restricted sense in which this term is now so generally known in the investment field its use is limited to those corporations which serve the public with gas, electric light, street and interurban railway service —and it is in this sense in which I use the term.

The great development in this line of work can only be appreciated by going somewhat into the history of the business.

Originally the gas, electric light and street railway service were conducted and managed by the residents of the particular city in which the utility was situated. Later a few examples were

worked out concerning the great benefit to be derived from what might be termed central management—that is, the management of several properties of the same character but in different cities by one management organization. This enabled combined purchases to be made, larger in magnitude and on more advantageous terms. Comparisons could be made of operating expenses and one plant excelling in some particular branch of the work could be used as an example to increase the efficiency in the other properties. Apparatus which might become too small for one property could be shifted to another property and its useful life thus prolonged. These, and many other advantages which should be apparent to all, were realized from the practical experiment of joint management, and it placed the business on a more profitable basis than had heretofore been realized and laid the foundation for the gigantic movement since.

Joint or common management naturally led to joint or common ownership. First this joint or common ownership was more general than common, in the sense of being identical.

A few investors naturally realized the advantages which resulted from joint management — and this circle of investors constantly grew. As soon as any of the operating concerns took up a new property to manage in common with the property they had already managed, these investors were willing to buy the securities of that company at an advanced market price in anticipation of better operating results and increased earnings. An investor might favor one particular property, or one particular city, and would invest in this particular enterprise to the exclusion of the rest. Others, for the sake of diversifying their investments would buy equally the securities of several different enterprises in as many different cities, while others would diversify to a certain extent but would keep the bulk of their investment in the particular enterprise which they thought promised the greatest growth or improvement.

The matter of diversity is a principle in investment much older than the business we are now discussing, and to give even the smallest investor the benefit of diversity, and to give equal diversity to all, the next and very natural step was the ownership of these properties by a single large corporation.

As it is impractical under our various state laws for one company to own directly the physical property of a gas works

in Pennsylvania and, say another in New York State, this diversity could only be brought about by the use of what is known as a holding company: that is, by having one company which would own the securities of a corporation organized to furnish gas in one state, or one city in one state, and the securities of another corporation organized to furnish gas or other forms of service in another state, or another city of another state. As a matter of evolution the tendency has been for these holding companies to acquire only the common stock, and in some cases merely a control of the common stock.

The wisdom and benefit of diversity of investment can hardly be questioned. For instance, during the past year there have been some portions of the country which have been subjected to a moderate degree of crop failure, tending to bring a certain degree of depression in certain communities and lessening the earning power of the public utilities situated in those cities, while on the whole the crop conditions throughout the country for 1913 were reasonably satisfactory. Where diversity of investment is secured by means of the holding company the general average of these increases or decreases in net earnings in any one year are stabilized and made of more constant value; greatly lessening both the risk of possible loss and the speculative features.

The holding company for all purposes has been subjected to some criticism by public and financial writers, and special criticism has been given to holding companies of public utility enterprises; but the fact remains that this diversity of investment cannot be obtained in any other way.

With the growth of the commission idea and the supervision of securities it is an easy matter to understand that one corporation operating throughout the United States could not, nor would it be permitted to have, one general mortgage on the property (in the sense of speaking of the property as real estate, bricks and mortar) and to deal out new bonds from its common mortgage either subject to the permission of any state commission or be compelled to get permission from 10 or 12 states when a small amount of bonds were to be issued for additional improvements on a single property in a single state. Improvements undoubtedly can be worked out on the present holding company methods, but the broad application of the holding company as now used is comparatively new and it is

unreasonable to expect that it could have reached a state of perfection at this early date.

While the public utility business is in a sense an operating business, it is also a construction business. The continual growth of the cities constantly demands more and more physical property. The only public record available over a term of years in regard to public utilities will be found in the reports of the Massachusetts commission, the state of Massachusetts having had a gas and electric commission since 1886. A study of these reports will show that on an average an investment of several dollars has been required for each dollar of increase in annual gross business.

It is estimated that there must be found for the public utilities of this country under the present tendency of intensive cultivation the sum of between $300,000,000 to $400,000,000,000 a year to provide for the new enterprises and the enlargement of the existing enterprises.

All securities follow more or less the law of supply and demand, and it is not surprising that a business which produces between $300,000,000 and $400,000,000 of new securities per year should find difficulty in creating a demand for these securities equal to the supply.

If we take the smaller amount named above, it means the raising of $1,000,000 every working day in the year; or it means that new investors must be found to the extent of 300,000 each year if their average investment is $1,000, or 30,000 investors each year if their average investment is $10,000, or the equivalent of 100 shares of stock bought at par.

There have been special difficulties surrounding the raising of funds for public utility enterprises. Up to the last few years there was practically no recognized market for any of these public utility securities except those of large companies which were listed on the stock exchanges; and it is still a very difficult matter to find a market for the bonds of the individual properties in the moderate and smaller sized communities. The financing of these smaller cities has only been possible in many cases by the use of the holding company, which provides a larger aggregate issue which can be listed on the large stock exchanges and a wide market by this and other means created for these securities.

There are four factors which must be given special consideration in judging the future of public utility securities, these being (a) the increased tendency toward control by the state of prices, earnings and issuance of new securities; (b) the increased rental value of capital, which has been pronounced in character; (c) the possibility of a trade depression of more or less intensity; and (d) the higher cost of labor and raw materials.

The matter of commission control of these securities is not new, and its results can be measured roughly by a study of the conditions in Massachusetts, which has had a gas and electric light commission for a number of years. It seems reasonable to believe that commission control will result not only to the benefit of the public but also to the benefit of the companies. Since the Massachusetts commission has been established and understood, the securities of the Massachusetts corporations have all sold on a more favorable basis than the public utility securities of other states, and, on a whole, it has been easier for them to raise money and at lower rates of interest.

While Massachusetts had such a commission for a number of years, the state of Wisconsin was about the first to follow with a similar commission on a comprehensive scale, and it is interesting to note that of the decisions given by the Wisconsin commission almost as many have been given raising rates as lowering them; and while the popular cry for the appointment of commissions has been for the benefit and protection of the public, the public utility properties have reaped in many cases a higher degree of justice under guidance of the public utility commission than could otherwise have been secured.

Many of the radical ideas that have prompted the appointment of commissions have been found impossible. Public utilities, in a broad sense, including railroads and other interests that serve the public, must be created if this country is to grow and prosper, and unless the existing public utilities are allowed to earn sufficient money to make this field of investment highly attractive it will be impossible to find the necessary capital to furnish these things which are fundamental to the country's growth and prosperity. Regardless of the temper of the people, or the disposition of these commissions, this fact must sooner or later be realized; and it is safe to say that it is already realized by many of the advanced thinkers even of the most radi-

cal school. I think the present state of public regulation may be dismissed with the statement that the public utilities will receive fair treatment; and that under the control of the various state commissions it will be possible for them to win a degree of public confidence that would otherwise be impossible; a more ready market will be insured for their securities at a better price and on the whole they will be enabled to get their new capital on more advantageous terms.

As to the general increased rental value of capital, it is needless perhaps to say whether this is temporary or permanent, but it is necessary to measure it on either supposition.

There can be no question that in the present generation and under similar conditions it has been necessary to pay a higher interest rate during the recent period to attract new capital than heretofore. The bond and note tables which have been used by all bankers for 40 or 50 years and have heretofore always been found adequate have in many cases been found inadequate during the past year or year and a half, as short term securities—viz.: short term notes or bonds having an early maturity—have been sold at prices on the market which brought about an interest yield in excess of any interest table to be found in any of the comprehensive computations that have served the needs of bankers for many decades past.

Even raising money under these high rates the public utilities have managed to make a splendid showing.

If this question of rental value of capital is merely a temporary one we may expect to see with diminishing rental value of capital a reciprocal increase in the market value of public utility securities. If this increased rental value of capital is permanent, there is every reason to believe that the public utilities can meet the situation.

It is interesting to note that in this day of so-called "high cost of living" the general trend of prices charged by the public utility companies has been always of a decreasing movement. As the cities have grown in size greater density of service has been realized, due to new uses and intensive cultivation, and voluntary price reductions have been made by the public utility companies; still further decreases are possible and will come about voluntarily under normal conditions in the security market. But if the abnormal conditions now prevailing are continued perm-

anently, the worst that will be required to meet this increase value of rental will be the discontinuation of further price reductions until the permanent increase in the rental value of capital has been equalized.

It is interesting to note, again, although referred to in a previous portion of this address, that the financial plans of none of the public utilities have ever been adequate to take care of the growth of the property during the life of the mortgage which has been placed on them. The result has been that few mortgages have ever matured, but many of them have been refunded long before the date of maturity for the purpose of authorizing a larger bond issue, and the great mass of the mortgages now on public utility properties have been placed there in the last few years. While the probable life of these mortgages would average about 30 years the probable age of the existing mortgages would not average more than 8 years. In other words, the average bond issue on the public utilities has yet over 20 years to run before it must be refunded.

During the period that an increased price had to be paid for the rental of capital it has been customary, where possible, to issue junior securities, or securities of the holding company, to enable the individual properties to be financed; and this is one of the reasons that has brought about the holding company. Properties individually owned could not be conveniently financed, while these same properties in the hands of a holding company could be financed; and unquestionably a much greater strain would have been thrown on the financial markets had it not been for the adoption of the holding company method of operation.

If the higher rental value of capital forbids the economical retirement of the bonds which have been previously issued for the purpose of authorizing a bigger bond issue, the mortgages can be continued, for many years to come, and financing can be done by the issue of junior securities or the securities of the holding companies, thus putting off until a more favorable time refunding of the existing mortgages.

Compared with other standard forms of investments, the public utilities are especially well off in this matter; first, because they have no large amount of indebtedness of this character coming due, second, because they had not acquired a very

high degree of credit before the period of increased rental value of capital overtook them. The result is that few mortgages are outstanding that do not bear a fairly high interest rate and instead of having to provide for an interest rate of 25 to 50 per cent more than the original interest rate, many of them could be now financed even under these conditions for the same interest rate as heretofore—not because this is a favorable time to finance them, but because the properties themselves are intrinsically so much better and their merits so much more widely recognized that they will command capital on practically the same terms as any other enterprise.

The effect of trade expansion or depression on public utilities has been one of considerable interest, and it is interesting to note that on the whole public utilities have fared practically as well so far as net earnings are concerned during periods of trade depression as during periods of trade expansion. This seems paradoxical at first glance, but easily understood on further analysis.

Industrial corporations manufacture commodities which vary in price. During periods of trade expansion the selling price advances materially, leaving a larger margin of profit. When a trade depression comes about sharp competition brings the price down in many cases below the operating expense of the weakest competitor. In the public utility business, generally speaking, competition does not exist; rates are fixed and cannot be exceeded in times of trade expansion and are maintained in times of trade depression. Public utilities deal with things that represent every-day use and there is not much difference in the volume of business done in a period of trade expansion or in a period of trade depression; normal business goes on just the same during a period of trade depression while new building and construction work is cut off. Little of the revenues of the public utilities are directly or indirectly due to construction work, and, roughly speaking, the effect of a business depression on the earnings of any particular corporation can be measured by the amount of its business which depends on continuance of construction work at normal rates. In fact, it has been demonstrated time and time again that even greatest increases are realized by public utility companies during periods of business depression, and a study of this matter by one of the public utility

houses of this city, the result of which has been expressed in charts and widely circulated and reproduced, is the most concrete example at hand.

If gross earnings can be maintained, or even increased, it is easy enough to see what the effect will be on net earnings when we remember that the selling price is fixed, and that during periods of business expansion these companies must pay more for their raw materials, which fact tends to prevent a high degree of prosperity during times of business expansion—such as will be enjoyed by industrials, or even railroads, which largely depend for their gross revenue on construction work; but when the period of business depression comes about, the selling price being fixed and a lower price prevailing for raw materials, it brings with it the very satisfactory condition of increased net earnings.

As to the matter of increased prices of raw materials and labor, the problem so far has been ably met by improvements which have constantly gone on in the art, and are still going on. More highly efficient apparatus has been produced, and as yet only applied in a limited degree. Simply the application of this more highly efficient apparatus throughout the business would bring about pronounced savings in operating expenses—and there is reason to believe that these improvements will be kept up.

Not only have these improvements made possible a more economical use of raw materials but they have saved enormously in the amount of labor which must be employed. These factors, coupled with the greater economy of serving a greater density of traffic, have more than offset any rise in the price of material and labor; and will probably more than offset any future rise in the price of material and labor—although, as before mentioned, it may be impossible to bring about reductions in the selling price of the service as rapidly as heretofore.

Much of the depression in the selling value of various securities has been due to apprehension on the part of the buying public of what constituted an infringement of the Sherman Law, and it has been a mistaken belief that simply size alone was evidence of restraint of trade. In the first place, it is generally recognized by all states that the public utility business is, and should be, a monopoly in any given city; and bills have been

passed not only recognizing this monopoly but permitting it and devising methods to care for it as a regulated monopoly.

It is apparent that the joint ownership or joint management of properties in states widely separated geographically can in no way be construed as restraint of trade. For instance, the common ownership of the public utilities in New York City and San Francisco, while constituting a huge business both as to capital and gross earnings, would in no way make possible restraint of trade or be an infringement of any of our general laws.

One of the promising features of public utility securities is the favor they have already met with abroad. Europe, through wars and possibilities of war, now finds itself facing a continued period of subnormal trade conditions. This in turn means easy money markets and a greater difficulty in earning a desirable return on capital. Public utility securities and the doctrine of public utilities has been preached and understood in the European markets and has resulted in an important addition to the small army of public utility holders in this country, so that the public utilities can in the future draw, not only on the investing public of this country, but on the investing public of Europe as well.

Investors have learned that personnel of management of a business enterprise is a great factor in its safety, and that is one reason why small enterprises, managed or directed by a single individual, have never commanded the confidence of the investing public.

The holding companies by their very magnitude cannot, and do not, depend wholly on the enterprise or brilliancy of any one man—although the prominence of some of the names in this group would indicate that such was the case.

Taking one example that has been brought to my attention, and which is often said to be a one-man concern, is, in reality, when carefully analyzed, anything but a one-man concern. Over 300 men in this particular situation are banded together in the form of an organization. Practically all of these men are graduates of our leading technical schools and have had many years of varied experience in this business, having spent two years in a special school devoted to a study of the various branches of this business.

I think it is safe to say that in the holding companies it is the tendency of all to train men to a higher state of efficiency and have at least one competent understudy for every prominent position. It is customary to bring in each year a mass of new men, especially in the form of well educated graduates from our various engineering schools, who by contact with the business become efficient in the management of each branch; and from this group of men, drawn in each year, a highly effective form of insurance is given that the enterprise will always be carried on with a reasonably high state of efficiency which insures against retrograding.

Not alone should we look at the internal workings of each of the various holding companies or joint management concerns, but at the whole trend of the business which, the last few years, has been to draw in the highest grade of talent and by actual practical contact with the work make the matter of conducing each branch of these particular public utilities a recognized trade or art, although no trade names are recognized for it. More and more competent men thus become available each year for the conduct of this business—and it is simply a matter of paying the price to get these men.

Take, for example, the National Electric Light Association, which has grown from a membership of a little over 100, say 15 years ago, to a present membership of over 14,000, having branches for self-study and advancement of its members in almost all of the cities of any particular size.

> I have known a number of brilliant men who have failed because they were unable to shake off their belief that a small element of dishonesty in business was really shrewdness.
>
> —HENRY L. DOHERTY.

It may be that nobody in the world foresaw more clearly than Mr. Doherty that the beginning of the Great War meant continued disturbance over a long period of time. In the last days of July and early August, 1914, people were still saying

there could be no war, and, if there was, it could last only a few months. Dividends on Cities Service and other stocks had been previously declared payable August 1st and September 1st, but at a meeting held July 31st it was resolved to stop payment of all dividends, including those payable the following day, in order to conserve the resources of the company. The Doherty companies were the first in the United States to take action for the protection of security holders as a result of the war, and naturally the step aroused widespread interest. Newspapers all over the country carried the announcement on August 1st, of which the following from a Columbus, Ohio, newspaper is typical:

IN order to conserve his resources during the political disturbances abroad, Henry L. Doherty has stopped dividend payments on most of the securities in which he is interested. Columbus holders of Doherty securities have been notified of this action and some of them have wired congratulations for the policy he has adopted. European investors are large holders of Doherty securities, in fact more shares are held abroad than in this country, and the heavy selling, especially from London, on account of the war situation, has alarmed Mr. Doherty and induced him to adopt a conservative policy and be prepared for any emergency that may arise. Thousands of shares of Cities Service and other Doherty securities are held in Columbus, but most of the holders seem to feel that in time market conditions will become normal and that values will again be restored to their former level. Mr. Doherty's statement follows:

"We are sending the following telegram to the Columbus Stock Exchange: Quote, we do not want to alarm others by an expression of our present views of the seriousness of the general situation, and while we are still hopeful that the acute situation that now exists will neither grow worse nor be long maintained, yet we feel that every precaution should be taken against a continued serious affair. After thorough discussion with the members of various boards, we have all agreed that all dividends including that due August 1, should be deferred until such time as a reliable forecast may be made of the outcome of the present trouble. Therefore, dividends have been deferred on both the common and the preferred stocks of Cities Service Company, Gas and Electric Securities Company, on the preferred stocks of the

Empire District Electric Company and Electric Bond Deposit Company. "I do not want to be the means of unnecessarily alarming any one, but both the public news and our private cables, according to our interpretation, mean that a very bad condition may last for a long time. To take this action and be responsible for recommending it was about the most disagreeable task I have never had, but I feel it my duty to do this. In the face of this crisis, I have always maintained our new business departments and construction work, but regardless of any favorable news at this time, we will cut these matters lower than ever before, and unless extremely favorable news comes, and comes quickly, we will cut our new business and construction expenditures to the quick. We may unduly magnify the possibilities of the situation, but we feel we are unsafe in depending upon financing our needs, except from our earnings. I have always been regarded as a rank optimist in other affairs, but I am the reverse in this case, and I hope that I am wrong; but other panics have largely been without cause and the present situation is not wanting for real possibilities. It will be my pleasure to admit my error to you later, if such is the case."

> Too many men neglect to study their own line of work because they are more interested in something else—something that gives them neither financial nor intellectual profit.
>
> —HENRY L. DOHERTY.

In November, 1914, Mr. Doherty went to England to study the effect of the war on the foreign market for American public utility securities. On his return he was interviewed by the financial papers, and the following article contains his views:

HENRY L. DOHERTY, head of the firm of H. L. Doherty and Company, has just returned from London with the report that financial men there are optimistic and encouraged. He says, in a statement issued on his arrival in New York: "Business is going on in Great Britain almost as if there were no war in existence. The spirit of optimism is prevalent everywhere. I was particularly impressed with the splendid showing made by the banks, a showing almost

unbelievable for a country plunged in a war. In spite of the fact that the exchanges are closed, there is a fair amount of investment buying, and bankers and brokers say there is constant inquiry regarding investments. General business is fairly good, in spite of the war. Of course, there is a falling off in many lines, due particularly to an effort at economy, but business is not by any means bad. The increased rates for government loans, or decreased returns upon investments, no doubt affect investment business, but bankers are not by any means staggering. There is a beautiful, quiet confidence among bankers and financial institutions that they will be able to meet the situation without disturbance. Manufacturing, of course, is somewhat disturbed, but in many cases it is nearly normal. There is a falling off in private trade, which affects manufacturing, but producers of war munitions are busy and working overtime. There is an activity in the metal industry that is encouraging, and everywhere is expressed—not so much in words as in actions and queries—a conviction that the investment buying in American securities by Great Britain will be larger than ever before. I was besieged with questions about American securities—national, railroad, industrials and others—wherever I went. All of my time abroad was spent in Great Britain, the major portion of it in London, and I am well satisfied from my experience and observations that when peace is proclaimed there will be a flood tide of investment of British money in American securities. Everything promises well for the future of the securities of the better class in this country."

And yet the progress we have made and the comforts we enjoy are due, in a large measure, to the liberality of our corporation laws and to our corporations.

The man who possesses wealth alone plays little part in shaping our financial or industrial destinies. The man who can command money is the important factor.

—HENRY L. DOHERTY.

The Electrical World also interviewed Mr. Doherty on European conditions as he found them, and printed the following article in its issue of December 5, 1914:

MR. HENRY L. DOHERTY returned to New York on November 17 on the steamship *Transylvania* from a trip to England. He sailed from New York for the other side on October 14 and spent a little over three weeks in England, being in London most of the time. In speaking to a representative of the "Electrical World" about business conditions as he found them in England and in this country on his return, Mr. Doherty said:

"I went to England in order to have a conference with our European representatives. I did not expect to take up any particular new business, but I had the conferences that were the object of the trip. I was rather surprised to find how confident everybody seemed to be about the ability of Great Britain to handle the financial conditions arising from the war, including the raising of funds for the campaign, without any disturbance. England is not underestimating the amount of money, time or men that will be required, but no feature in the outlook appears to cause the least alarm.

"The shopping district in London is about as busy as ever. Except for the presence of soldiers everywhere, and especially in great numbers along the east coast, there is little evidence of war. Men are being drilled even in churchyards and in all parks. Except along certain lines like the manufacture of jewelry and cotton goods, there is not much evidence of a falling off in industrial activity. There is a good deal of evidence of increased business activity in certain lines due to the orders for war supplies of all kinds. Orders of this character mean that some factories are being crowded to the fullest extent that they will stand. Almost everybody in England is doing something for the purpose of relieving distress and suffering of the people at home and at the front.

"The street lighting in London is reduced to such an extent that it makes one nervous to ride at night in a taxicab. This, of course, is done primarily to avoid interference on the part of the street lighting with the work of search lanterns. Apparently observation towers are scattered pretty well over London and the

east coast. In some places these towers are improvised in one way or another, but in other places the tops of buildings are used.

"I do not believe that any one can determine the immediate outlook in the investment situation. There is not much doubt that the European buying power is cut down enormously by the war. On the other hand, the most significant factor I observed is that everybody is assured that, outside of subscriptions to the war loan, what investment buying there is will be in American securities. People who have criticised the American market and securities and 'Yankee' policies are not talking that way any longer. The universal feeling is that American securities are the safe securities to buy now. Certainly very much the largest percentage of investment buying for a time in the future will be in

> Whether it be an individual, a small business concern, a large institution or a city, there are principles and laws common to all which are essential to growth and prosperity. It must be seen that these principles and laws must be well understood by the individual citizen before being applied by a municipality or community.
>
> —HENRY L. DOHERTY.

American securities. Even now a certain amount of investment buying is going on and inquiries keep coming all the time.

"Bankers in England feel that there will be enough new investment buying of American securities to offset the forced liquidation, and that in addition to that factor there will later be an absorption of a reasonable amount of securities from investors in this country.

"On my return I was astounded to see how greatly sentiment had changed during the time of my absence. People who told me before I left that in their judgment we should have a long period of business depression were the first to tell me when I got back that we are going to see greatly increased industrial activity here. The news from our operating properties is, on the whole, very encouraging. As a matter of fact, I think that I see a more pronounced change in sentiment than the actual conditions warrant. It is important to remember, on the other hand, that noth-

ing contributes so much to increase the stability of business as a sentimental feeling that conditions will improve. How much the news of the election has contributed to the changed conditions that are evident everywhere I do not know. Certainly it has played an important part in the condition of sentiment. The result of the election is, I think, interpreted generally as a protest against too much interference with business. It has been interpreted by business men, and especially by the people, as an indication that the great body of voters want to have every encouragement given to our railroads and business industries. I think that the record of views expressed by the election will tend to lead the present administration to go still farther in its encouragement of business."

> Many a man has made a needless failure because for purposes of immediate gain, he has let himself lose the reputation of dealing fairly and generously with others.
>
> —HENRY L. DOHERTY.

1915

Danger that the United States would be dragged into the Great War was the outstanding feature of 1915. The sinking of the Lusitania fanned popular indignation to white heat. It was a year of marked progress for the Doherty organization. Cities Service oil subsidiaries were expanding rapidly and the world-wide demand for oil was in excess of the supply.

The Denver Times reprinted from the New York Evening Post extracts from an article on public utilities, in which Mr. Doherty was given high praise.

N an article on "Men Who Have Helped to Make Public Utilities Servants of the Public," the New York *Evening Post* places the name of Henry L. Doherty in the same class with those of Thomas A. Edison, Theodore N. Vail, president of the American Telephone Company; Wilbur C. Fish, president of the Hudson & Manhattan Railroad Company; Alexander C. Humphreys, president of the Stevens Institute, and Samuel Insull, president of the Commonwealth Edison Company.

The article says of Doherty:

'The majority of men whose names are bywords in the public utilities field began life poor. They entered the industry when it also was poor, and have grown rich with it. Few of these men, however, began so poor that they sold newspapers when not yet 10 years of age, and few of them had to leave school at the age of 12 to support widowed mothers.

"Henry L. Doherty, senior member of the banking firm bearing his name, president of the Doherty Operating Company and head of twenty-four gas, electric light and power companies, having a combined capitalization of $60,000,000, began life very far down the ladder. He had to sell papers when 9 years old, and on the death of his father had to see to the support of his

mother and two sisters. That was when he was 12. Now, at the age of 45, located on top of the ladder, he looks down and regrets not a single rung climbed.

"Doherty was educated at the public schools of Columbus. Educated, that is, if you call what one learns in the primary grades of our public schools being educated, at the mature age of 12, in 1882, he entered the employ of the Columbus Gas Company, as an office boy. His salary was $3.50 a week. Thereafter his further education was gained by self-study. He was in the employ of the gas company until 1896, when he attained the place of chief engineer and assistant to the manager. The fourteen years between his entrance into the company and his promotion to chief engineer embraced a period of hard work.

Forming the Banking Firm

"In 1897 the young engineer became manager of the Madison Gas & Electric Company and later was elected its president. He filled a number of positions after that, becoming chief engineer and general manager of the Denver Gas & Electric Company when he was 30 years of age. Afterward he became president. In 1905, at the age of 35, he formed the firm of Henry L. Doherty & Co., an organization that from its earliest infancy became one of the largest and most distinctive factors in the public utility industry.

"Possessing a fertile mind and a wide knowledge of the field which he has done so much to cultivate, the advice of Henry L. Doherty is sought constantly by the leading gas and electric concerns of the country, and there are few companies which have not adopted in whole or in part his ideas and plans for enlargement of the field of commercial gas and electric business. The same applies to the companies in which he is the controlling spirit, and which extend into many states. The Cities Service Company, a $50,000,000 corporation, organized in the fall of 1910, is the holding company in which a number of the properties of the Doherty organization are grouped, every one of which is bigger and more efficient than it would have been but for the mind of Henry L. Doherty.

How the Public Is Won

A striking illustration of the method of pleasing the public was given last summer, when Doherty was in Toledo, leading the fight of the Toledo Railway & Light Company against a

3-cent-fare ordinance. Doherty recognized that publicity was the single manner of overcoming opposition and gaining his ends, and he straightway contracted for columns of advertising space in the dailies, telling the public each morning and evening the principles for which he was fighting. The contest lasted six weeks, and though he was not successful in routing his enemies, Doherty had the satisfaction of knowing that he had turned the tide of defeat so that it ran around his company, and not through it.

"Doherty is a man of large capacity, with a marked ability for grasping whatever proposition is placed before him. He is a good talker, and a better listener. He has listened and observed so much that now he can talk on subjects that are not even remotely related to his business, which is his life. He can talk on music, photography, art, chemistry, history and exploration.

In the New York Evening Post of April 14, 1915, the following article, giving Mr. Doherty's views on taxation of public utilities, was published:

THAT there is a tendency toward higher taxation of public service corporations all the time is the opinion of Henry L. Doherty, president of Henry L. Doherty and Company and of the Cities Service organizations, who said today: "It should never be lost sight of that every form of taxation of public service corporations is a tax upon the consumer. Heavy taxation of public utilities reacts directly and indirectly on the public themselves, and it is not the company that pays the freight, but the service.

"Undoubtedly these companies should pay into the public treasuries their full share in discharge of the public burdens, but whatever is exacted from them in the form of excises or taxes in excess of what others similarly situated are required to pay, distinctly operates against reductions in charges for the service rendered or a limitation of the facilities furnished. In short, if these public utilities must make special contributions to the public funds, it must be at the expense, in one form or another, of the particular members of the community who use their service.

"This service, which is available to all who desire to use it, should be furnished at the lowest figure possible, and every

public service corporation ought to make every effort to increase its facilities and to reduce its charges as rapidly as possible. It should not be handicapped in doing so by exactions on the public at large, which reduce the ability of the companies to do so by the amounts exacted. If this simple but fundamental proposition were recognized by everybody, there would be an end of legislation to impose special taxes and excises upon public service corporations, whose use of the public streets is, after all, required by the public for its own convenience.

"If, however, it should be necessary in certain cases to comply to a popular demand for special payment for the use of public streets, the public should be educated to the knowledge of the effect upon rates and facilities which the application of such a theory involves.

"The laying of a special tax on public utilities is a fallacy which puts an economic burden on the community. The average gas and electric company transmits the equivalent of thousands of tons of coal over or under the public streets without wear or tear, noise or interference with other traffic. To lay special burden on them means a higher selling price for gas and electricity, and a lessened opportunity to compete with coal, oil and other commodities which are delivered by wagon.

"Wagon delivery means the wear of streets, with the cost of repairs, the littering of streets, which means the cost of cleaning, unnecessary noise, discomfort and interference with other traffic. Then why should the public with heavy taxes try to discourage what is good for themselves?

"Take, for instance, the requirement that a street railway company should pave between the rails and a strip 12 inches outside of the tracks; that is a relic of the old horse car days. When the cable car superseded the horse car and the electric car took the place of the cable car, cities went right ahead assessing this special tax, on the ground that street cars damaged and wore out pavements. That the companies object to burdens of this kind means nothing to the public, which is only too apt to be be so narrow minded that it thinks that it should always be against whatever the corporation wants."

> Fools learn by experience, but wise men know better to start with.
>
> —HENRY L. DOHERTY.

In 1915 Mr. Doherty was asked to give an address before the faculty and students of Harvard University on public utilities. He said:

AM somewhat at a loss to know how to treat this subject. It has many different angles, and one or more may be treated in a single lecture; but all of these many angles cannot be considered except with hours of time at our disposal.

In less than one year from now, and before I reach my forty sixth birthday, I will have served one-third of a century in the public service business. In spite of a widely varied viewpoint of both occupation and geographic location, my many years of experience do not enable me to speak with much assurance on this subject in view of the many problems which now confront us.

We are living in an age of intolerant opinion and intemperate speech.

Perhaps no other age has been handicapped by so many impractical reformers and plain demagogues.

In the competition for public following, the man with the most radical ideas and the most extravagant promises is likely to be the most easily heard and the most eagerly followed.

Restrictive legislation and public advocacy of still more drastic legislation has lost the railroads the confidence of many thousands of investors, and has lessened the credit of all enterprises that are more or less subject to governmental control.

New conditions have arisen which call for new methods. The existing conditions cannot be permanent, and the problem of raising capital to provide public service for a rapidly growing population will be a difficult one for some time to come.

There is an old saying that "a little knowledge is a dangerous thing." I cannot subscribe to the wisdom of that saying, unless it be interpreted to mean that "knowledge, be it much or little, if overestimated is a dangerous thing."

A wave of antagonism swept this country against the so-called "trusts," and the eddy currents which followed in the wake of this wave have been antagonistic to practically all business effort.

The men who have attempted to shape public thought on the government's control of business may be generally placed in

two classes—the plain demagogue and the impractical reformer.

No generation can claim the exclusive credit for the demagogue. As long as there are people to fool he will be with us. But I doubt if any other generation can successfully claim such a large crop of shallow-minded reformers.

A word of caution to university men does not seem out of place.

When I hear the views of the modern reformer a line of classic literature, suggested by Charles A. Collin, always comes to me: "Knowledge comes, but wisdom lingers."

It is sometimes difficult for those of us who are seriously working to serve the public to maintain our good nature in the face of senseless prattle by numerous self-constituted critics. We have not reached perfection yet by a long way, but we are making progress all the time by honest labor that brings out the "sweat" on our brows and bodies, while our critics suffer only "perspiration" of the jaw. You can catch the whole difference when I say we "sweat" and they "perspire."

In these days of so-called "high cost of living," when prices are assumed to be all upward, the electrical men have, on an average, reduced the cost of one candlepower of illumination by electricity to one-fifth of what it was twenty years ago. If we could be freed from silly restrictions and constant harassment we could do still more.

The tendency toward all forms of business control puts some problems up to us in regard to raising money for public utility enterprises that are almost unanswerable.

The public almost universally believes that to capitalize an enterprise for more than the actual number of dollars which were put in to create the enterprise is to "water the stock." "Watering" stock is now considered to be a crime. Cost alone is assumed to produce value.

Cost is only one factor, and not a controlling one. If I spend a million dollars to create an enterprise which proves incapable to earn even its operating expenses, it is worthless, except for its junk value. The mere fact that it cost a million dollars does not make it worth a million dollars.

The impractical reformers have preached the doctrine that no property can be worth more than it cost. This means that the owner cannot have a property ownership of more value than

the money he expended, but may have a value of less than he has expended. No wise man will provide capital for an enterprise where all profits are to be confiscated, but he alone must bear all losses. No honest man will solicit capital from others to be invested under such conditions.

Prosperity for this country means employment for all labor. Available labor can only be employed under normal conditions by carrying on a large amount of construction work, building railroads, and things like that. Capital cannot be had on the theory that the builder must pocket all losses and give up all profits. Therefore the more public opinion tends toward this belief the more will be the curtailment of employment.

Hundreds of communities in this country need street railways, gas and electric plants. If the impractical reformer wants to be of some practical use to his fellow man he should go out and raise the capital to build these enterprises, and thereby add to the prosperity of the country and furnish an economic convenience to the residents of these communities. If he succeeds all around it will be because "wisdom" has come to keep company with "knowledge."

There are always a few thousand proposed enterprises to be had by the banker for consideration out of which a profitable enterprise may be created.

What the public generally refers to as the "promoter" is what Wall Street refers to as the "banker." What Wall Street calls the "promoter" is the man who is practically a "broker of enterprises"—the man who undertakes to interest the banker in an enterprise. Wall Street, when it wants to joke a bit, refers to the promoter as "the man who will furnish the ocean if somebody else will furnish the ships."

A banking house may expend as much as a quarter of a million dollars in a year in looking over various enterprises without taking up a single one of them. It is needless to say that all the expenses of preliminary investigation must be earned back from the enterprises that are taken up—and yet no one has even dared suggest as an item in valuations this expenditure for preliminary investigation. This is only one of many items of expenditure which are rather remote, and is only mentioned as an example to show how inadequate an inventory of physical property will be toward showing either cost or value.

A dozen waterpower projects may be investigated. Some expense will be incurred in the examination of each. Perhaps test holes will be dug to determine whether good foundations can be had for a dam. This work sometimes requires an expensive pumping plant even for the investigation work. It is not difficult to expend, say, $20,000 only to find that the proposed enterprise is not sufficiently safe.

When we found one which seemed all right we would figure up that by an expenditure of $50,000 for land and water rights, and an estimated expenditure of $950,000 for dams, machinery, transmission lines, etc., we could create an enterprise that ought to earn $300,000 per annum, provided the man who now had his own power plant would pay us as much for power as it cost him to generate his own.

But—and here is a point not to be lost sight of—you can never get the consumer to pay you all that the service is worth to him.

If you are ever called upon to create an enterprise you will find that the consumer will not do business with you unless you will save money for him. Often you will have to furnish a service for one-tenth of its value to the consumer. So, of the economies you make possible for the community, you will often get only one-tenth, out of which you must pay your operating expenses, your taxes, your interest, and then take what is left for your profit. In addition to this you will be looked upon as a robber rather than as a benefactor if your profits exceed 6 or 8 per cent.

But in this form of a wholesale power business the service that is worth enough to the consumer to yield $300,000 profit can probably be sold for enough to yield a profit of $200,000.

In the old days we would say "fine." This enterprise when created will be worth $2,500,000. We would authorize, say, $1,000,000 of 6 per cent bonds and $1,000,000 of common stock. We would make our bargain with the promoters, the investigating engineers and the lawyers that they would take their pay in stock. We would pay the brokers in stock for getting subscriptions, and we would induce the investor to buy the bonds by giving him a stock bonus. Whatever stock could be saved would be the banker's profit, and whatever portion of the subscription not taken by the public would be retained by the banker.

The investors would get $1,000,000 in bonds and $500,000 in stock for $1,000,000 in cash. Or each investor would get $1,000 in bonds and $500 in stock for each $1,000 in cash.

The final distribution of bonds and stock would be as follows:

	Bonds	Stock
Subscribers	$1,000,000	$500,000
Brokers	.....	100,000
Promoters, engineers and lawyers	.....	100,000
Bankers (profit)	.....	300,000
	$1,000,000	$1,000,000

The whole investment world has been educated to the idea of prospective value. It is now proposed to restrict capitalization strictly to cost. The idea is not objectionable to us, but the attempt at revolution rather than evolution brings in many cases suspension of activities and lack of employment.

But the modern idea goes further than this—and to this we do object. The impractical reformer says: "Your property only cost $1,000,000 and it can't be worth any more than that. You can have no profit except on your expenditure of $1,000,000. All profit in excess of that we will take from you by reducing your rates." The customers who bargained with us and made us give them a saving of $100,000 per year are now given another $100,000.

You can't make water run up hill, and we people who have to find money to furnish the equipment to transport people, to give them light and power, cannot do it on a one-sided bargain, where our investor takes all of this risk and all of the profit is given to the customer or taken away from the enterprise in the form of taxation. You can make a hog root for truffles all day and then take them away from him as fast as he finds them; but you cannot make a large number of intelligent investors do this for all time to come, even if that policy is advocated by a dozen professors who have all studied political economy in a German university.

As an adviser on investments, I say to you: "Don't take good money out of a bank and put it into a new enterprise unless the enterprise you intend to put it into is pretty sure to make each one of your dollars worth two dollars."

I think I can say that the public utility men of this country are not against regulation of rates and methods of doing business, provided such regulation is prompt and intelligent. No one has been seriously hurt as yet in the matter of curtailing profits, as voluntary reductions have always been practiced by these companies as a means of stimulating business.

Regulation so far has been more annoying and retarding than actually injurious so far as the public service companies are concerned.

I honestly believe, however, that regulation, agitation and legislation against the railroads and the public service corporations has cost the public directly and indirectly $10 for every dollar it has saved them.

Regulation retards development in many ways. Let us assume, for example, that the next craze for reform will be aimed at the farmer. Bills will be passed appointing an agricultural commission and require the farmer to file a schedule of what he proposes to do and how he intends to do it. Before he can plow a field he must file an application and get the consent of the commission.

The farmer files an application to plow. The commission is busy but the order finally comes down. But in the meantime the sun has baked the ground as hard as a brick. When the farmer wants to harvest the inspectors are so busy on other fields that his grain is on the ground before the order can be granted. So the farmer says: "I will just grow grass hereafter."

When a proposition is brought in to our house the first question we ask is: "What state is it located in?" If certain states are named we dismiss our caller promptly—and courteously if he does not make courtesy impossible by being unduly persistent.

Wisconsin is a state of marvelous natural opportunities, but it is not growing very fast—and my own opinion is that a little more reform would insure a lesser rather than a greater population, and instead of having a very slow increase in the value of property a little more regulation in the interest of the public would cause property to shrink in value and rents to become less and less. Kansas was once the shining light of the whole world and led the way on every radical reform movement—and it led only to poverty and suffering. Today Kansas is one of the

safest states in the Union to invest your money in, even though a new set of reforms is looming on the horizon.

Impractical ideas have driven a good deal of capital beyond the borders of our own country. My own firm never expected to go beyond the boundaries of the United States, but we have now made some investments in Canada and are investigating other countries. As yet we have invested only a little more than ten million dollars outside of this country, but we may transfer our activities largely to foreign countries while our own country is getting its equilibrium. I say that advisedly, for I do not think for one moment that the great mass of the American people are going to be permanently fooled by the deliberate efforts of the demagogue or the misguided efforts of the impractical reformer.

There are hundreds of small cities in this country that want street railway lines. A street railway will help them to become a big city. If you will build the railway, I will buy real estate in that city. If the city grows big and prosperous the inhabitants will tell you that you are entitled to no profit. They will tell you that the "unearned increment" (whatever that is) belongs to the public. However, I may have bought my real estate at $30 an acre, cut it into city lots six to the acre, and have sold each lot for $2,000, or $12,000 an acre—a profit of 39,900 per cent—and I am respected and have the good will of the public—but if you want a 100 per cent profit you are a robber.

During my years of service in the public utility business much of the land in Chicago and New York has appreciated in value 10,000 per cent—and yet the tendency is to deny all profit to the public service property.

You do not have to have the land speculator, but you do have to have the railroad, gas, and electric service.

This country needs half again as many miles of railroad as it now has. The misinformed reformer has directed his efforts to cutting profits to the vanishing point on the existing railroads. His efforts will finally result in a raising of rates instead of a lowering of rates. His study of sociology in the German university gave him knowledge but not wisdom. That is not the worst of it, for this theory has brought railroad building almost to a standstill.

Farm products that could be transported at a cost of 1 cent per mile by railroad are being hauled by wagon at a cost of 25

cents per ton mile. Passengers that could be hauled at 3 cents per mile, and at a speed of 25 miles per hour, are being hauled in a buggy for 15 cents per mile at a speed of 6 miles per hour. Farm land that would be worth intrinsically $50 per acre with reasonable railroad facilities is still worth only $10 per acre. Other land that would become town sites and would be worth $6,000 an acre is still worth only $50 an acre.

The old saying "penny wise and pound foolish" applies aptly here, as well as the other saying that "we waste at the bung and save at the spigot."

I suppose every man in this room has been an advocate of the Government's policy of conservation. It sounds good, but it has been conservation in name only. Our fuel supply is in the most imminent danger of exhaustion. Under the Government's policy we burn millions of tons of coal every year to generate power that might be generated by water that now runs idly to waste. The policy of the Government under the high sounding title of "conservation" cannot be regarded as anything but flagrant waste.

As for myself, I am a cheerful, grinning, optimist. Even if the fellow from the German university never gets wise enough to find out that water won't run up hill I will bet that the man who wears overalls will find it out.

The American public have to have light, heat, power and transportation. These enterprises must be allowed to earn a profit such as can be realized in other forms of investment and other countries or the public will suffer for lack of facilities.

With common sense conditions and regulations the matter of raising capital for public utility work is comparatively simple.

The public utility men may quarrel among themselves and criticise each other, but the business as a whole has been conducted along pretty clean lines, and while most other lines of business have a lot of pure shysters in them, the public utility business has none that I know of.

Most of the men in the public utility business are both educated and experienced. The ethics of the business are way above the average. There is no thought of making money except by the legitimate method of increasing sales and decreasing expenses.

The business has so far proved exceptionally safe from an investment standpoint.

The safety of the investment is largely due to the growth of our American cities and the inherent regulation of profits—and this inherent regulation I will explain later.

Our American cities grow at a rate which will double their population every 20 years, or a little more. As a city grows in population its consumption even on a per capita basis increases. For instance, a city of 10,000 inhabitants may use only 1,500 cubic feet of gas per capita, while a city of 1,000,000 inhabitants may use 9,000 cubic feet of gas per capita. So while the city grows one hundred fold in population the consumption grows six hundred fold.

As we sell our product at a fixed price our profits do not fluctuate like an industrial enterprise. As orders slacken the steel mill must not only face a shrinkage in output but also a lower price per ton. The public service corporation furnishes an everyday necessity and its volume of business is not much lessened, if at all, when a period of business depression comes. Service is furnished at a fixed rate of charge to the consumer. When a period of depression comes we are able to buy all of our materials at a lower price and when a period of great business activity comes we are compelled to pay more for our materials. In a few instances we have had the amusing example of larger net earnings in times of depression than in times of prosperity.

While the public service companies in their origin were generally capitalized in excess of their cost, and often as much as 100 per cent in excess, yet this over-capitalization in the further growth of the business has become negligible.

A company organized to-day, in the light of our present knowledge, does not have to be over-capitalized in the raising of funds for its future growth. What is now known as an "open-ended" mortgage can be used, and with the issue of each additional block of bonds an interest rate can be fixed which will enable the bonds to be sold at par.

However, the plan of fixing a high enough interest rate to enable the bonds to be sold at par is prejudicial to the interests of the consumer, as the company will obtain a lower cost for capital by selling bonds at a discount bearing a lower rate of interest. Roughly speaking, if a bond must bear 7 per cent to yield par, a 6 per cent bond can generally be sold on a 6½ per cent basis, a 5 per cent bond on a 6¼ per cent basis and a 4 per cent bond on a 6 per cent earning basis.

The problem of raising money for public utility enterprises is no different in character from raising money for any other enterprise.

The investor wants safety and profit. The investor must believe in the fundamental merit of the proposition and that it will be honestly and efficiently managed. Everything else is mere detail.

In spite of the oratory of the demagogue and the highbrow talk of the impractical reformer the American corporation is the most potent force for democracy which this country possesses. One of our great orators once said about the Declaration of Independence: "It opened up the paths of opportunity and placed the star of hope above the cradle of the poor man's babe"—and those words express my sentiment towards the liberality of our corporation laws.

I will go further, and say that the men who are endeavoring to restrict the liberality of these laws, are, consciously or unconsciously, curtailing the opportunities of the poor boy and helping to build up an aristocracy in a country whose cornerstone is democracy.

The majority of exceedingly rich people in this country are of no particular importance except in the columns of the penny newspapers.

The great powers in the business world are not the men who possess money, but the men who can raise money.

Every man in this room can easily raise the capital required to carry out any enterprise he may fancy if his friends and acquaintances believe he is big enough for the job he wants to tackle.

The business world of today is largely controlled by the poor boy of yesterday. The money for my first enterprise was secured from the different people I had been associated with from time to time—and many of them were men who as boys worked with me carrying or selling newspapers or working as messenger boys.

The average man is apt to lose himself in a maze of details rather than to keep before him the main objective point. When you start in to raise money for a public utility enterprise, or any other enterprise, what you want is money and not simply the unavoidable machinery whereby the relations may be properly expressed so they may be enforced.

For the details of the different forms of securities which are used I would recommend the paper written by Mr. Ralph D. Mershon entitled "Some Things Engineers Should Know Concerning the Rudiments of Corporate Finance," printed for private circulation by the National Electric Light Association in 1912.

The tendency of today in the public utility business is to use but three classes of securities, viz., bonds, preferred stock and common stock—and, as a rule, only common stock and bonds, or common stock and preferred stock.

Bonds are generally restricted to an amount on which the interest will not be more than half the earnings of the company. A mortgage is issued to a trustee and, under this mortgage, divisible pledges in the form of bonds are issued. The rights of the bondholder and the obligations of the company are expressed by the deed of trust, and you can write any obligation into the trust deed you want or leave anything out, provided you keep within the scope of the law. So a bond is not a definite thing, but is based on a contract, and to know exactly what the bond is you must have a copy of the deed of trust, although the principal features of the deed of trust are generally engraved on the bond. The bonds may be in all sorts of denomination, and may be coupon bonds or registered bonds.

The tendency is to make all mortgages for an indefinite aggregate amount. That is to say, more and more bonds can be issued by the company of equal rank to the bonds first put out, but under restrictions named in the trust deed, and which restrictions are intended to keep the original bonds of at least equal security to the conditions which prevailed at the time they were issued.

Usually not to exceed 60 to 85 per cent of new bonds may be issued as additional property is acquired, and generally further issues are restricted to an amount on which the total interest will not exceed one-half of the earnings of the company.

Instead of using the old form of sinking fund, or retirement clause, most of us now use a plan whereby the company adds a fixed amount of property each year or else retires or buys for a sinking fund a given number of bonds.

In 1904 I wrote a communication to several bond houses proposing the form of sinking fund now used, and I believed the plan was original with me. Since then I have had my attention

called to a mortgage in which this plan was used as far back, I think, as 1889.

However, up to 1906 it was customary to provide, where a sinking fund or a retirement clause was used, that bonds should be bought or retired each year. This put us in the silly position of drawing bonds by lot from people who do not want to sell them and of issuing and selling new bonds to some one else who has to be found and coaxed to buy. You cannot depend upon selling new bonds in place of the bonds drawn for the sinking fund as these bonds may belong to an estate, or the owner may be traveling in foreign countries.

Bonds are generally in the denomination of $1,000, and interest is paid on presentation of a detached coupon every six months. I predict that the tendency will be toward a registered bond with interest payable by check every month.

We collect our bills monthly from our consumers, and it is absurd for us to expect the man who is both our customer and our bond holder to forever continue to permit us to collect our bills from him once a month and only pay what we owe him once in six months.

Monthly payment of interest and dividends is rapidly opposed by many financial houses—largely because their office methods are 50 years behind the times and they cannot handle accounts expeditiously or economically. In the up-to-date public utility offices large numbers of accounts, far exceeding any list of bondholders or stockholders in any of our companies, must be handled—and they are handled monthly with the greatest ease.

Many of the large financial houses have none of the up-to-date office machinery or methods; and the work of the office is largely done by men who were apprentices in this work long before the present office methods and machinery were invented. Instead of heading reforms and improvements, they sullenly concede only what they must from their antiquated methods.

Some of the foreign financial houses pride themselves on not even using typewriting machines - and one very fine old gentleman even yet refers to all financial houses who use typewriting machines as "bucket shops." When a financial man wants to resist the encroachment of new methods he generally says: "That is the method used by the bucket shop or the confidence man."

It is customary to speak of all redemption clauses as sinking funds. Correctly speaking; a sinking fund is one in which the bonds are kept alive as outstanding bonds, and interest is paid on these bonds, which interest is in turn used to purchase more bonds.

People talk about preferred stock as though a preferred stock is a definite thing. A preferred stock is just as definite as the length of a piece of string. This, like the bond, is a matter of contract, and the contract is expressed generally on the stock certificate. It is generally a preferment as to assets or dividends. The dividend is generally limited to a fixed amount, and may be cumulative or non-cumulative.

Every company must have a common stock. It is the only thing which is definite. It represents the final equity in dividends and assets.

In the early days the different public utilities were generally owned by local capitalists. The directors of the company were generally the larger shareholders and the ordinary board would be made up of bankers, manufacturers and merchants, all of them, as a rule, having some other business which occupied practically all of their time. The manager and superintendent, as a rule, had had no experience except that gained in the local plant.

I will not endeavor to tell you how central management first came about, but it proved to be wonderfully more effective than local management.

It was found that by central management service could be bettered, the charges to the consumer reduced and the profits to the owner increased. The men familiar with the results secured by central management desired to become the owners or part owners of these properties. They organized syndicates among their friends to buy these properties from the local owners.

A management concern would buy first one plant and then another, rebonding and recapitalizing it as a rule, and depend upon their friends to furnish the money. New life and new energies were put into the work of management, and new methods and new appliances were constantly brought forth.

Central management led to central ownership. This could only be accomplished by means of the holding company. When we speak of a holding company we generally mean a company which owns all or a majority of the stock of the individual com-

panies. Under our existing corporation laws identity of ownership of a number of plants located in different states can only be accomplished in this way.

The holding company owns stocks and not property, and cannot issue a mortgage bond. As a rule, the holding company issues only preferred stock and common stock. If desired, the bonds or stocks—or both—can be deposited under a trust deed and a collateral trust bond issued. Collateral trust bonds, however, are not favored in this country, although the same investor will readily accept a mortgage bond or a preferred stock of less intrinsic merit.

Under central management, and especially under the added advantage of central ownership, the business grew by leaps and bounds—and is still growing rapidly.

Public utility securities (except on a few enterprises and in a few localities) have always been sold on a high earning basis to the purchaser. In other words, the buyer could get a higher interest rate on his bond or his stock than on any other class of investment. The reason for this is simple. The supply has always exceeded the demand.

A few years ago public utility securities were practically unknown, and investors in public utility securities were few and far between.

The purchase of the properties from the local owners alone represented stupendous sums. New investors had to be found to furnish this capital. The secret of increased earnings was largely due to intensive cultivation of the market. To get $1 of increased gross earnings in the public utility business requires the investment of, say, $5; so growth of business means that more and more money must be found as capital. It is estimated that there is needed every year $400,000,000 of new capital for the public utility work of the country.

During the past two years nearly all of the public utility operators have had to curtail their activities for lack of additional capital—or what amounts to the same thing, the inability to get new capital except at prohibitive rates.

The dearth of finances has been due primarily to the world-wide disturbances that have taken place, principally due to the Balkan War and then the present European War. But the shallow mind of the impractical reformer and the perverted principles of the demagogue have played no small part.

Agitation, often of an intemperate character, has driven capital either to other fields or into hiding.

It is unpleasant to have your teeth fixed up by even a skilled dentist, but when the demagogue tells you he is going to insure against the possibility of your biting your neighbor by yanking out all of your teeth you naturally prefer that somebody else should own the mouth that he is going to operate on.

Railroads that once floated bonds at 4 per cent may have to float new bonds to pay the old ones off at 6 per cent—largely on account of the misguided reformer and the demagogue.

The public will in the end pay the freight both literally and figuratively.

The relief work made necessary during the past winter for the great number of unemployed workmen was largely the result of intemperate agitation.

It requires but little brains, talent or energy to make capital unproductive and to stagnate the development of the country. To coax capital into an investment the future of which is threatened is a difficult task. To make capital accept less than the risk is worth, with other investments and other countries open to it, is futile.

Assured of fair treatment, capital can be found in abundance to carry on the public utility work of the country; convinced of fair treatment, it will be had in time on the most advantageous terms accorded to any class of investment—other than government bonds; including, of course, as government bonds, state, city, county bonds, etc.

No matter whether your income is three thousand a year or three hundred thousand a year, it is well to stop and consider whether you are buying things because you need them, or even really want them, or simply because you think the neighbors think you ought to have them. —HENRY L. DOHERTY.

For many years Mr. Doherty and Elbert Hubbard were close friends. Mr. Hubbard's tragic death on the Lusitania was an especially keen shock to Mr. Doherty. The July, 1915, issue of The Fra was a memorial number in honor of its lamented founder. Mr. Doherty's contribution was an eulogy called "The Trinity of Life."

HE first time the Lusitania made a trip across the ocean I was a passenger on her. I have been a passenger on her many times since.

Every voyage on that ship for me was a pleasant one. She has carried my friends coming and going. I have marked my mail "S. S. Lusitania," and I have watched for the mail, the propositions and the contracts she has brought me.

When the Lusitania sailed for the last time she had eleven of my friends on board. But in spite of all this, when I learned of the disaster which had overtaken her my first thought was of the safety of Elbert Hubbard.

It would surely be a comparatively simple trick to build another Lusitania, but an impossibility to produce another Elbert Hubbard.

The most flattering portrait that the greatest artist of all the world and all the ages might paint would fail to give the music of the old time voice. The greatest sculptor could not give the old time grip of the hand.

The World's Great Assets

The greatest assets the world possesses are its great minds. When a great mind goes, the world is indeed poorer.

Hubbard was a great mind.

We would be barbarians still if we depended alone upon the strength and endurance of human labor.

The progress of the world is measured by brain throbs and not by centuries.

Hubbard meant much to me, and if I had his wonderful ability to condense a nebulous cloud into one small and perfect crystal of thought, and then express that thought in simple and beautiful language, I could preach many a sermon from the life and work of Elbert Hubbard, plant many a guidepost along the road of human progress, and lighten the load of human burdens.

But we can't all be extraordinary. Some of us must work with our hands and feet to load and carry the bricks to build the temple which the Great Architect has designed. While I still belong to the "hands and feet" brigade, I aspire to be a master workman in my own field, and Elbert Hubbard has helped me much in that aspiration.

It was his message to Garcia that first awakened my keen interest in Hubbard and commended him to my admiration. The message to Garcia was also a message to me. It has been a message to others, and can be a message to those yet unborn.

Since my appreciation was first awakened I have enjoyed much pleasure and profit from the work of Elbert Hubbard.

It is hard to think that such a dynamic mind has been silenced forever. It seems as though it must be only a bad dream.

Inspiration

And yet measured by the work he has done, the people he has known, and the part he has played in the affairs of men, Elbert Hubbard has lived several lifetimes.

Most lives are pitifully narrow, even though they may stretch beyond the traditional period of threescore years and ten; but his life, although short, was along the broad highway, and he was a part of or was in touch with almost every human activity, and so when calculated from proper measurements of his life's dimensions he had lived much.

Whenever I met Hubbard, even if it were no more than a momentary accidental meeting that did not go beyond a give-and-take "josh" on both sides, yet I parted from him with a scrap more of either wisdom or inspiration.

The man who can give inspiration to those he meets is a success indeed, even though he rests in an unmarked grave. Our lives are short at best, but things we do may live forever.

A True Builder

Hubbard knew the world better than the world knew him, and, while he made his mark, and a brilliant one, it will grow in size and brilliancy as time rolls on.

In his daily life he was an animated sermon on the delightful trinity of life as it should be—Good Humor, Good Fellowship and Good Health.

He was a fearless writer, and little minds were often prejudiced against him by little things he wrote.

He would have had more friends in this generation had he been more of a demagogue; but he will be loved and remembered by coming generations when the demagogues of this generation are forgotten—or, if these demagogues are remembered at all, they will simply be remembered as being so weak that for the mere sake of gaining an indifferent livelihood they could not help but play and prey on the base passion of hate in their fellow men.

If one has talent either as a writer or as a talker they find the shortest road to popularity is to misuse their talents by filling the working people's minds with fancied wrongs.

Hubbard chose to coax music and harmony from the less responsive chord of good fellowship rather than applause from the oversensitized chord of prejudice.

He not only did not fill the working people's minds with fancied wrongs, but he established industries and filled the working people's pay envelopes with real money with which they could buy the comforts of life.

A Great Business Man

Elbert Hubbard for a man possessed with a heart, was one of the best business men I ever knew. As a creator of business enterprise he made a grand success; and if we had one man for every ten thousand of population with the creative and business genius of Elbert Hubbard, unemployment would disappear and our country would be prosperous beyond the most optimistic dream of the most optimistic dreamer.

Hubbard was versatile and a success from no matter what viewpoint he will be judged. Most men depend upon imitation for success. Elbert Hubbard was creative and original, and the foundation stone of his success was initiation not imitation.

He was kind and optimistic. He preached the gospel of usefulness and happiness.

He would not want his friends to be plunged in gloom over his untimely death; and if he had been compelled to meet his fate alone, without thinking of the distress of others, we know how grandly he would have played his part. He would have sent back to us all a pleasing and consoling message.

The Best Monument

If I should meet a similar fate my friends could build no monument that would please me so well as to give the broadest

possible application to the work I had finished, and to carry on to its full harvest the work I was doing when death struck the tools from my hands.

Let those of us who knew him, loved him and admired him, give the widest application to the work he has done, by giving the widest possible circulation to what he has written. Let us do what we can to give the magazines he has founded the influence and usefulness that they would have attained had he lived. He can not write more, but we can carry his messages that teach usefulness and produce happiness to those who have never heard them.

I will try to do my duty whether you do yours or not; but surely we can steal a minute from the day now and then, or more often an hour from our sleep, to carry the work Elbert Hubbard has done, and the work he was doing, to those who will appreciate his labors as much as we do.

So with this appeal, and the willingness and determination to do my part, I will go back to plow and plant in my own field.

Every year, and age, and almost every day, sees some new scheme sprung that promises to give us more of this world's goods and with less work. First, it is pure fiat money with nothing back of it but a printing press. Then it is a minimum wage, then a single tax, then minimum hours of work, and then a community form of government and equalized living conditions—and the changes are run and rerung, in new garb, to muddle and befog each generation.

—HENRY L. DOHERTY.

In the fall of 1915 the Society for Electrical Development, of which Mr. Doherty was still president, put on a drive known as "Electrical Prosperity Week," which was shared in by all electrical interests, whether members of the society or not. Mr. Doherty was in Toledo at the time, but, in response to numerous requests, sent messages to various newspapers throughout the country. Typical of these is one from the Louisville Post, which said:

HENRY L. DOHERTY, president of the Society of Electrical Development, and one of the most noted public utility operators in the country, wired the following statement to the "Evening Post" from Toledo:

"Electrical prosperity week is intended to be a huge alarm clock to awaken the people of the country to the benefits of electricity. Electricity has done much for human happiness, and can do more and still more. It is the cornerstone of modern comfort and prosperity. There is no form of human labor that electricity will not reduce or eliminate. Electricity, the noiseless, tireless, dirtless agent, has reduced many a grinding form of human toil to no greater effort than to push a button.

"Whenever you see a man, woman or child doing any form of human labor, remember that electricity will either eliminate or reduce that work. If you don't know how to apply electricity to eliminate this work, put the problem up to the first electrician you meet.

"It took many decades to make the women of the country appreciate the benefits of the sewing machine.

"The human race has in some instances lost generations of time in the adoption of improvements which contributed to comfort and happiness. Every tick of the clock means a lost opportunity for many who are slow to appreciate what electricity can do for them. The man who plows with a crooked stick in some far-away country is relatively no more backward than a great mass of the people who live where the benefits of electricity knock daily on their door, but the knock goes unheeded.

"The slogan of the jovians is, 'Altogether, all the time, for everything electrical.'"

For six and forty busy years he's camped upon this best of spheres, and it's a darned good place to dwell, because such men as Henry L. are here their services to give and show the people how to live. For six and forty cheerful years he's brightened up this vale of tears, and in that time accomplished more than most of us who reach four score. If he has such a record made, ere yet his youth begins to fade, what will it be when eighty years have grayed the hair above his ears? Oh, may we all be still on deck to celebrate that time, by heck!

Written by Walt Mason
May 15, 1916

1916

Preparedness was the paramount national problem in 1916. The United States was becoming more and more nearly involved in the European struggle, and farsighted men realized that entrance into the war was merely a matter of time. Meanwhile the regular routine of business and social activity continued. Before the Philadelphia Electric Company Section of the National Electric Light Association on March 20, 1916, Mr. Doherty made the following address:

R. CHAIRMAN and Gentlemen:—First I want to express my pleasure at being back before the Philadelphia Section of the National Electric Light Association. I got your two meetings mixed up, and I thought that Professor Scott would be the speaker of this evening, so I came over here tonight unprepared. I was sitting in my seat while your chairman was introducing me, and when he kindly announced what I would talk about, I thought—"Well, your chairman hasn't got anything on me, for I don't know either." But I feel very much at home, because I am before the Philadelphia Section, and also because the decorations are very appropriate to my name, and I suppose in my special honor. I do not, however, want to claim more credit than is due to me for any of the work of the N. E. L. A., and while I may be the one who conceived the idea of the Company Sections, and perhaps was the daddy of it, Mr. Eglin was the mother of it, and he is the one who had the real labor pains to go through. He had the work to do. I had the idea, but I believe that that idea is going to bear fruit bigger and bigger every year, and is going to be a great instrument in pushing this business to a grander and grander success.

I am not prepared tonight to speak to you. I have not any set speech to make. I did not expect to make any speech, and I have been talking so little for the last two years because of trouble with my voice, that I feel a great deal off and out of practice. I will not attempt to follow any particular line. If I can say anything which interests you or that will be instructive, I will be greatly pleased. I have not reached the age yet where I think I am a preacher, in spite of my gray whiskers—I am only 45 years old, and I still feel quite young, so I am not ready to preach —even to the youngest members of your section.

I do, however, want to call your attention to the wonderful growth which has taken place in the electrical business over a period of time when other enterprises have either lagged or gone backwards. You know that during the last two or three years we have had a period of business depression—not only throughout America, but throughout the world. The depression started in many countries with the Balkan war in the fall of 1912. In 1913 the Kaiser came out with his $250,000,000 opinion regarding the income tax, which was the signal throughout Europe for the big European war. They all interpreted that as meaning immediate war—something on the scale we are now having; and just about the time that things were quieting down, the real European war came about. This European war has brought a great period of prosperity to America, and I hope that it will be followed with the kind of prosperity that is not based on war conditions, and I believe it will. But all through the period when every other business, nearly, in the United States was suffering, the electrical business continued to advance, and even then, in spite of the fact that we could have accounted for an enormous reduction in revenue and an enormous reduction in consumption, due to the introduction of the high efficiency lamp.

In spite of an enormous business depression and the introduction of the high efficiency lamp, the electrical business continued to grow by leaps and bounds; so if you want to work your imagination and speculate a little bit (and perhaps many of the men in this room have already done that) you can see what an enormous growth of business we would have had, if we had had normal business conditions, and if we had had a standard efficiency lamp to develop our business with, without having a greatly reduced revenue and consumption due to that lamp.

That gives you an idea of what the natural growth of the electrical business really is, and to get that idea you have to make allowance for the business depression and for the high efficiency lamp, so we are in a business which is growing faster than any other business—a business that requires more and more men. There is a world of difference between being in a business requiring more and more men and being in a business where you must wait for the fellow ahead of you to die off, and there is more incentive to improve oneself.

Not long ago—probably two years ago—I talked to an organization of railroad men, and I called attention to the wonderful growth of the railroad business for a great many years. Then I showed how railroad development had fallen off and had finally come almost to a standstill—due almost entirely to the foolish ideas of the public about "regulation," and I called the attention of these men to the fact that they were unfortunate, and that perhaps many a man in that room holding a subordinate position would have been in a position of great responsibility, if the business had continued to grow as it had grown during the two decades before. I tried to point out some of the ideas which I believe were correct and sound, regarding the reasons for the falling off in the growth of railroad business, and I also tried to point out who was the one who had been punished—whether it had been the railroad companies or the public. I called their attention to the fact that these people who had tried to skimp profits too close in the railroad business had been responsible for making many a man continue to travel by carriage or automobile at a cost of 10, 15, or 25 cents a passenger mile, as against getting service by railroad quicker and more efficient and safer at 3 cents a mile; in their efforts to clip railroad passenger rates to 2 cents a mile in the East and their efforts to clip it in the West to 3 cents a mile, they had simply succeeded in preventing a lot of people from getting railroad accommodations at all, and the lack of continued building of our railroads was holding back the development of the whole country.

Now we have that serious problem to meet in the electric light business, as well. There is a tendency to regulate the profits of the electric companies and cut them so short that there is no encouragement to go ahead in the active development of our work—if one looks only at the immediate future. But most of

us in the electric business are optimistic, and that explains a great deal of the success of the electrical business. We are not afraid but that the good sense of the people of this country will prevail sooner or later, but it is to men like yourselves that we must look for better education. We must teach the public that the electric light business is entitled to the same degree of profit that would be realized in other lines of business which must accept the same risk. The idea that you can limit the profits of any business to the mere interest return that you would get on a mortgage is idle. Capital will not go into that class of business, and it is men like yourselves who have to teach the public that the reward must be sufficiently liberal, not only to encourage the development of the existing plants, but to encourage the establishment of new plants.

About three years ago, or whenever we held our convention in Seattle of the National Electric Light Association, I was one of the speakers on the water power question. I have always taken issue with the government on what they call their "policy of conservation." I never was willing to call it a policy of conservation. In fact, I call it a policy of flagrant waste. Of all the natural commodities in this country which are likely to be exhausted, our fuel supply is one that seems the most likely. In other words, the exhaustion of our fuel supply is the most imminent among all of our natural resources. And yet every year we are burning millions of tons of coal to generate power that might be generated by water which now runs idly to the sea—simply because the policy of the Government is so restrictive that nobody can accept a lease of a water power right, under the terms they impose.

I started in a few years ago to develop the White River in the Ozark Mountains. I never would have started on it, if I had not intended to put in several dams, because each dam would be needed for the total amount of power I would get out of the river. We organized what I think was one of the best construction camps I have ever seen. We had churches, a schoolhouse, and sent all the kids to school, sanitary arrangements, and had no sickness, and we were prepared to go ahead on a five or ten year course of development on the White River. But this stream was held by the government to be a navigable stream. It is navigable, perhaps, for a chip, but not much more. The gov-

ernment reserved the right to say how our dam must be built up and to remove it. Well, we fooled around two years or more, tried to get reasonable bills past Congress to go ahead and develop the balance of that stream, but we were not successful. Almost every bill that was recommended to Congress would have some provision in it such as this—that our rates should be regulated by the Secretary of War, or whatever Cabinet member goes in as the Secretary of War. At that time Stimson was the secretary, and he was insisting on it. I telegraphed him one day, and said, "As a plain citizen, I object to the Secretary of War neglecting his duties as War Secretary to regulate the rates of power companies belonging to somebody else."

Well, we had to abandon the development of that stream and break up our construction camp and have abandoned it for all time to come, because we would not go back now and attempt to work again, even though we could proceed as we wanted to do at first.

The policy of the government is restrictive. The thought of the community is to regulate the corporation and split pennies with the corporation. We must have an army of men to teach the public what the corporation is, and I am one of these men, and I think I had occasion before one of your other section meetings to talk about a corporation in terms of being a thoroughly democratic thing—something made for the poor man and men of moderate means, rather than the rich man. I still maintain it is, and that it should be given every advantage that a partnership or an individual has in business.

No restrictions and no taxes are placed on the individual or the partnership when they are trying to transact some business —the partnership or the individual is left absolutely free, while the corporation has every sort of restrictive measure thrown about it—such as how they shall issue their securities, the proportion of preferred stock and the common stock, that there shall be an extra government one per cent tax, do this and do that, and in spite of the fact that the corporation is the only hope of every man of moderate means—of every consumer who wants cheap service. If we cannot have the corporation, then everything must be done by the rich man; and yet in a corporation, made up of a lot of individuals—perhaps not one of them worth more than a thousand dollars—we can group our capital and

appoint men to run it for us and make that capital just as potential and effective as anybody's capital, and that is just what a corporation is. It is intended to put a group of poorer men on par with the rich man and it does it.

I think it was Ingersoll, who writing about the Declaration of Independence, said these words, and I think they are beautiful—"It was one of the greatest documents that was ever written. It opened up the paths of opportunity and progress, and placed the star of Hope above the cradle of the poor man's baby."

I think that could have been said about the plan whereby corporations were made possible, and the corporation—instead of being disliked by the mass of the people, ought to have the good-will and the support of the people, for their own good.

I started to tell you about this meeting out at Seattle. After I left that meeting I went over to Spokane, where we are interested in the gas company. They had a Board of Trade dinner, and they asked me to speak. I told them I did not care to speak, but I would stay to the dinner. The first speaker got up—they had banners around the room showing what this inland empire had produced in the way of crops and minerals, and so on, and he spoke in glowing terms of the wonderful growth of that community, and that state—and then he said—"If we had proper railroad facilities, we could produce—not twenty-two million dollars' worth of products, but two hundred and twenty million dollars' worth of stuff."

The next speaker also bewailed the fact that they did not have proper railroad facilities. The next speaker was a railroad man and told about land a few years ago worth $1.25 an acre and now worth nearly $1,000 an acre. Now I am not quick at figures, but you can figure up these things. Land worth $1.25 and now worth $1,000 an acre—nearly a thousand times the original—about 100,000 per cent. There are too many ciphers for me to count I am not used to figuring profits that way. Well, he told about other land selling for $3.50 per acre and now worth $500 an acre, and he went on and told about these marvelous growths in value of land.

Then the next speaker got up—and he was a typical little Board of Trade man in a little Board of Trade. He told about the fight they had had with the railroads, and for twenty years they had been fighting against the railroad rule that the freight

rate to Spokane should be the rate to the Coast, plus the rate back again, and he wound up with the declaration—"And we promise twenty years more fight until we get everything we are entitled to. The railroad company is entitled to a nominal rate of interest on the bare physical value of its property and nothing else."

Well, about that time I changed my mind about not speaking. I leaned over and whispered—"Mr. Toastmaster, I will speak." He looked kind of nervous, and he had an idea something had gone wrong. He asked me, "What will you speak about?" And I said, "You will find out. You can arrange when, because I am going to speak."

Well, he finally announced me as the next speaker, and said he would give me ten minutes. Well, I thought he would have a hard time calling me down if I went over the ten minutes, so I went ahead. I said, "Gentlemen, I have a pretty large investment in your city. I am sorry that I did not hear the speakers tonight before I made that investment. If I had, I would not have made it. I would have gone somewhere else." They all sat up and listened. I went on, "Everybody here agrees that the only thing you want out here is railroads, and you have laid down the rules under which railroads are to be built. They must get a nominal rate of interest on the bare physical value of their property. If they get less than that, you cannot make up the loss. The best they can do is to get this interest on their property at a nominal value. Well, there are only two parties who will build a railroad under those rules—one is a fool, and the other is a philanthropist.

"You don't catch a fool soon enough to catch him with any money. And a philanthropist doesn't want to be abused. He wants to be praised for what he does, so he will not build your railroads. Now, who will do it? I don't see how anybody at all will build them, and yet you all admit that the future of your city and state depend upon additional railroad facilities."

Well, the first few words I uttered seemed to be a little antagonistic to them. I started on conservation. I said, "You have all been educated to the idea that we all want conservation. Well, we don't want waste under the name of conservation. We do not want retardation under the name of conservation."

They have a very able editor out there on the Spokane Review, and he was sitting about three seats from me, and he has

educated them all to believe they wanted "conservation." So I went on: "If there is one state in the Union that does not want conservation, it is Washington. Two-thirds of all your public land is withdrawn from settlement. How in the world can you build a railroad across the state, of which two-thirds remain unproductive, and make it a paying proposition? And how in the world can you hope to get anything but excessive freight rates for hauling goods across that region which is withdrawn from production of freight and business?"

I asked them a few other questions about conservation that I did not think were quite clear. When my first few words were so antagonistic they started to "boo" me, but the chairman rapped for order. I thrive pretty well on that. So I kept on talking, and pretty soon I got a little applause, and more, and finally I turned to this editor and I said, "Now I have no fight with this editor. You think he is an asset, but I think he is a liability, and I hope some big New York paper offers him three times more money than he is getting. It would please me more if he went to London."

Then I proceeded to tell them something about railroads. Well, I never got the applause of all the men in that room, but they had apparently applauded all these previous speakers, and every man had applauded their sentiments. I did not talk twenty minutes, and yet in that time I got more noise than all the other speakers put together. I think I had fully forty per cent applauding my view.

Now apparently in one little speech I had been able to change 40 men from the views they had just applauded a few minutes before, and that is a good example of what the forces of men tonight who are sitting in many other halls in Chicago and San Francisco, and here and all over the country in your Company Sections could do if we were organized to properly train public opinion, because we have got all the best of it. All we want is a fair deal, and when I look at the faces in this room and their number and intelligence, it is surprising to me that we have allowed the public mind to get so many erroneous impressions as they have for a number of years. I think we are to blame, because we have not gotten public opinion where it is more truly representative of facts, and where we are not interfered with in the attempt to do business by honest means—not

only for ourselves, but for the public. We are willing to do everything we can for the public and give everything they are entitled to, but there is such a thing as driving too hard a bargain with business, and that is one of the things we had in this country until the European war.

I have the inspiration to go back to my friends and associates in the National Electric Light Association and say that we do not need any other educational source except the men who make up the various company sections, and I mean to take this up with my associates on the Public Policy Committee—Mr. McCall, Mr. Insull, Mr. Edgar, and Mr. Brady. That inspiration has come to me, talking to you tonight. I am going to depart a little bit from the general line on this now, and this is worse than extemporaneous.

I think I will speak about the trend of the business as we see it today. Our small residence business (and I speak now of the properties controlled by Henry L. Doherty & Co.) is to my mind of rather doubtful value to us. That is, we have been compelled in most instances to lower our rates to such a point and the high efficiency lamp has cut the consumption to such a point that unless we can develop with it a very large amount of business not relating to strictly lighting business, a lot of our small customers are not a source of profit to us, but of loss. We are making a great success in the introduction of other uses for electricity besides lighting. The number of appliances is growing. It may be interesting to you to know that this electric flag which you have seen—that we have sold in the little city of Toledo 400 of them. I have an idea that Toledo is one-tenth the size of Philadelphia, so you can see that 4,000 of them would yield a pretty good profit on sales of lamps to the customers, and load for the lighting stations. We have in our "Electrical Prosperity Week" last year in almost every one of our central stations at least doubled the business over the same corresponding week of a year ago, and while I intended to talk about certain engineering features of our business, I am inclined to digress along here enough to speak of the Society for Electrical Development, of which I happen to be president, and which I hope will prove of great success to the electrical fraternity.

This society is formed and depends entirely for its support on voluntary subscriptions. We plan to raise a minimum of

$200,000 a year. We plan to expend that in whatever way will be of greatest good to the industry. The original plan was national advertising. It is interesting to know that some of the advertising rates in some of the big weekly periodicals cost $6,000 a page, so if we had spent it in that way, our $200,000 would have bought 33 1-3 pages of advertising in these large national periodicals. Well, that would not be a drop in the bucket in getting results for the electrical business, but we have planned to spend that money. If any of you are in New York I hope you will go into the offices of the Society, and see what we have planned to do. For instance, in this Electrical Prosperity Week of the nation, all the newspapers and magazines took it up and printed articles about it, so when we figured on the value of that reading space, as they do on their advertising space, it got over a million dollars' worth of free publicity, and it did not go on the advertising pages, but very often on the front pages of the newspapers and sometimes in the form of colored supplements or front pages of the supplements. There is a world of difference between an advertisement and reading matter.

In the society we are trying to do a great many things. We have gotten a number of the trade journals to establish electrical departments. Now contrast that against a few pages of advertising matter in the back of a journal. You can see how wonderfully more efficient it is. Every one of those electrical departments that we are able to establish in those journals becomes a center of energy, preaching all the time a greater application of electricity.

The truth is that the science of electricity has progressed far beyond its application. The one thing I want to do now is to start a sermon that should reach the mind of every man, woman and child in the United States—and that is the principle that whenever you see anybody doing any form of manual labor, it can either be reduced or eliminated by the use of electricity. If you do not understand just how electricity could be used to perform that work, put it up to somebody else, and if he does not know, try some other man, until you find somebody who knows.

I was watching your band tonight, and I want to say that you have a good band, and I enjoyed the music—but when I saw these fellows blowing their horns and working hard, I felt

that we should be playing these instruments with electricity, instead of manual labor. I want to compliment this band. I think it is wonderful to come here and see their organization and listen to the way they work together. I think I know something about music, for I have the credentials of one of my friends who told me I am a good musician. It was like this—I have an Aeolian at home and this friend of mine is a great big boob, and he is always easy to fool. He is married to one of the greatest singers in the country, too. He came down to my house from his office in lower New York, and I put him on a seat away in the end of the room, told him I would play a piece on the organ. There was no wind in the thing, and so I sat there pumping away and pretending to play this piece—and it was a difficult piece of music—and he listened and when I finished he said: "Say, that's wonderful. I don't know how in the world a busy man like you can ever keep up practice to play like that. Play something else." So I said, "All right, but wait until I change the roll."

I have just had some of my friends down to the house, and I was telling them about it. Brown, the editor of the "Progressive Age," was there and he said, "You don't practice what you preach. You have a phonograph, you say, and an organ and a piano, and none of them work electrically." I said, "Oh, yes, the piano does." "Well," he said, "why don't you have electric appliances on the organ and the phonograph?" So I said, "That is a real rebuke. I'll do it." So I have just had the player and the electrical device put on the organ, and I tell them that it makes more noise than the organ—only there is not so much variety.

But we do want to preach the doctrine of using electricity everywhere for everything. I think we ought to love this business. I know that I love it. I always feel thankful that I am in the electrical business, but I am not the only one who holds that you can roughly measure the extent of civilization by the extent of reduction of human labor by other agencies, and there is no other like electricity. So while we are out selling our wares and coaxing our people and strong-arming them to use electricity, we are a factor in a better standard of living. We are reducing human labor and contributing to the progress of the country, and nothing will do this so much, as to bring about all the application of electricity. That

is a certainty now, by the development of the science, so I feel that we do not have to apologize to anybody for our business. It is a business with a moral end to it. It hurts nobody and helps everybody.

Now a word or two about the development of the business. I often wonder if we do not tend to drift along and all go the same route, and even do things that may in the end be foolish. You know here lately I have been rather amused at the tendency toward indirect and semi-indirect lighting. I do not mean to criticize indirect lighting in this room, because it seems to be all indirect, instead of semi-indirect. But there are lots of places where it is totally out of place, and I have often waited to see if they would not see it. I have often wondered if I would not find somebody lighting a marble staircase with indirect lighting, and if they do, they will break a few people's necks. I see place after place where this method of lighting does not belong. Because in many places we see by shadows and not by light. It is the contrast that we see and the shadows of objects help us to avoid running into them. Time and time again I have seen that kind of lighting in places where it was totally inappropriate. I just use that as an example of applying something without very much thought.

Another thing—we thought in our concern that there is an enormous development of electricity along the line of electric heating, and yet there does not seem to be quite the discrimination used in the work of many people—they do not draw the line of discrimination where it should be drawn. I think it is very well to keep in mind that where you want large quantities of heat you must study carefully whether you will attempt to do it with electricity, because the heating equivalent of electricty, as compared with gas, oil or coal, is very low. I am afraid that some of us are working on wrong lines of heating work. Later on we will have to abandon them and we are neglecting meanwhile other lines that we could get and hold.

Now I mean by that that due to our better control and due to matters of that sort it is often possible for us to use electricity for—say, large enameling ovens. I am doing that, and yet the enameling oven is one place where I do not think electricity will live, because it takes a kwh of electricity to equal about 5 cubic feet of gas. In other words, a kwh is, roughly, 342 B. t. u. A cubic

foot of gas has 650 B. t. u. as a rule, a gallon of oil about 140,000, and a ton of Pittsburgh coal about 2,240,000, or something like that.

A lot of engineers should juggle their figures a little bit, and say, even if you have 100% efficiency of electricity, what an efficiency you will have for other heating means.

I do know there was a day when all the gas men were spending no end of time and effort to put in gas engines. I started business as a gas man, but I did not spend much time on gas engines. I could see the undertaker coming around on his way so I decided myself to do something else, so I had no funeral as every other gas company did. I do not think any city ever put in as many gas engines as the Milwaukee Gas Light Company, and I don't believe there is a single one running now. They have been taken out by the wholesale in both Detroit and Milwaukee, and it was due to the fact that they did not try to estimate what the future of that business was going to be.

Now I don't want to tire you out. These are little friendly meetings. I am here more to say "Hello," than to preach. I do wish that we could in some way develop in every man connected with the National Electric Light Association the power of original and careful thought. I was quite complimented by the chairman's introduction of me tonight, but I can plead "Not Guilty" of being most of the things that he has said. I have been fortunate in having difficulties ahead of me, and every man in a great deal of his business experiences has hard times. Some of our boys come in and tell me about their troubles, and I say: "Boys, by golly, that is the way we hold our jobs." "If we did not have any difficulties, any office boy could run our business. We are developed by overcoming obstacles." The man who has not had obstacles to overcome does not have that factor in development. Be cheerful. I do not know anything in the world which is quite as much of a help to get along by, as the determination to never get discouraged and never lose your temper, and always be good humored. It is more or less a habit with me. About two years ago Wall Street was on an awful string, and this story I have heard from others, and I was reminded of it. One of the prominent financial men of New York City, and in fact of America, was trying to convince me it was up to me to put up a great big lot of collateral to help a similar house to

ours, because they were liable to go busted. No less than five or six of the big international houses were on the verge. Some little thing happened and I laughed about it, and he looked at me and was disgusted and said, "I don't see how you can laugh at a time like this." And I answered, "Well, if I could not, I would be dead."

You know most of these obstacles are like the troubles the old woman had. A lot of old women were sitting around one day and talking about their troubles, and finally they went over to the old grandmother, who was pretty deaf, and one of them shouted, "Granny, I suppose you have had lots of troubles. What was the worst of them?" And the old lady said, "Well, the worst troubles never came."

Another thing I have often thought of is this: I believe that wisdom is not so much a question of native brain ability as it is to be able to think of things dispassionately, without prejudice. I think if you will take any man whose brain is not diseased, and if he is temperamentally so he will never let an expressed opinion warp his desire to get the truth, that man will make an awfully good imitation of a wise man. The men who are generally wrong in this world are those who are always ready to express their opinion, and then instead of trying to think what their opinion ought to be, they are trying to support the opinion they have expressed. So if some men would learn that early in life, it would be a great benefit to them.

If I could, I would like to have every boy, when he is about 13 years old, read the Autobiography of Benjamin Franklin. It has a lot of interest in it and a lot of real inspiration, instruction and explanation. While I did not read it when I was 13, and I was many, many hard winters past 13, still if you have not read the Autobiography of Benjamin Franklin, I think it is worth while reading. There is many a good lesson in it. Now Franklin has been ridiculed as a scientist. I don't think many of our engineers would pass their approval on Franklin's stove. And I doubt the kite story, and the current travelling down the cord to the key. I think it travelled along outside, and a man who tried that experiment, if he did get any current, would not live to tell about it. But I do think that Franklin had a lot of wisdom and knew how to express it.

As we go along in this world, there are certain things which have a great deal to do toward making it easy for us or making it hard. One is, whether the people like us or not—whether we are always carrying a grouch and making trouble, or whether we are trying to patch up and bring about an organization movement. Every organization has a lot of trouble makers in it, and a lot of them who are speaking ill. Better get it out of your system, but the best way is to try and think good thoughts about everybody. I would sooner be a sucker any time than a bad judge, and I have been a sucker a lot of times—believe me. It contributes more to my peace of mind than the other thing.

I have just a few more words to say. There is not a high place for everybody. Everybody cannot be the Charles A. Coffin of the electrical business—the head of the biggest electrical company in America—but we all can find a better place, and a better and still better place and greater comfort and greater satisfaction in serving, whatever our duties are, and doing them well. Reward may not come quickly. There is many a man who has had not only to wait for opportunity, but to make it.

And I often think—when I read about this, that, and the other thing—I often think of the men who founded this country. I often think of the hardships those men endured. In one of Webster's speeches before the Senate he speaks about the old cabin in which his older brothers and sisters were born, and he said: "It was not my good fortune to be born in that cabin." And then he tells there was not another habitation until you reached the rivers of Canada, and for seven years through that awful war, Webster's father protected his family against wild beasts and brought his children up to a condition better than his own. Well, I don't know whether Daniel Webster's father ever earned much fame or anything else, but he must have earned a great deal of satisfaction in the success of his family.

I don't know whether many of you have ever been interested in the work of Louis Pasteur. I have a library of translations of Pasteur's work and books about it, that I have gathered up at a cost of about $2,000. I am going to send over two or three books for your library—the Biography of Louis Pasteur. I don't remember who wrote that biography, but the remarkable thing, to me, is the fact that he has compressed in one little volume more than I have in all this set of books I have taken years to collect.

In fact I had always looked upon Lord Lister, the great Scotch surgeon, as a plagiarist, and the man who travelled on Louis Pasteur's reputation. But I found when I ran across this little volume that Lord Lister was not trying to steal any of Pasteur's work, but had given Pasteur full credit and told him that he was basing his surgical work and the protection of wounds on Louis Pasteur's methods.

They say a prophet is not without honor, save in his own country. It was interesting to note that at the time of the Franco-Prussian War the methods that Lord Lister was so successfully applying in Scoland were not being applied in Paris at all, and yet they were given birth right there. In speaking about Pasteur, I have often wondered whether Louis Pasteur was the great man, or Joseph Pasteur, his father, who so determinedly brought his children up to a condition better than his own. He was a tanner, without any education, but the family made every sacrifice they could to educate this boy, who proved to be such a wonder, and contributed to the progress of the world.

Unfortunately, he is known more for his work, on hydrophobia, than anything else, but that is not his greatest work. This book is well worth studying because it will show how the work of Louis Pasteur, his chemical researches, his study of animal diseases, his work on agricultural chemistry, on wines and the products of the soil, had such a far-reaching effect on business that they enabled France to pay off the enormous indemnity of the Franco-Prussian War.

I meant to say a great deal about our own prospects here, of what the National Electric Light Association wants to do for the progress of the men in this business, who are earnest and honest and willing to work, and industrious, but I have taken up a great deal of your time. I apologize for not having a more complete and consequential talk for you, and I must leave to somebody else the thought of making your section as much as it can be with good work without crowding, and then bringing your section instruction to benefit—not only the members, but every employee of The Philadelphia Electric Company—not simply your own good, but the good of the industry throughout the entire country. I thank you, Mr. Chairman.

Some people say we are crazy, but we don't mind.
—HENRY L. DOHERTY.

An important event in 1916 was the floodlighting of the Statue of Liberty, originated by members of the Doherty Organization and carried out under the auspices of the New York World. The lights were turned on December 2, and the same evening a banquet was given at the Waldorf-Astoria, at which the principal guest of honor was Woodrow Wilson, President of the United States. In an appeal for contributions at the 1916 convention of the National Electric Light Association Mr. Doherty said:

WISH to present a matter in which all electrical men should be interested. The New York World started a campaign last Wednesday to illuminate the Statue of Liberty. This matter has been in process of development for a year or more; the approval of all the necessary government officials has been secured, plans have been made, and bills introduced in the Senate and House to provide for this illumination.

In conference with the representative of the New York World I told them that the electrical men are the most enterprising group of men in the entire country. I hope we can prove that to the World, because the illumination of this statue means a great deal at this time. It is not only a patriotic movement, of value just now, but it means that if we put this through we shall have every soldiers' and sailors' monument throughout the country illuminated. This will be a wonderful example of flood illumination. You can imagine how beautiful this and other statues will be, skillfully lighted by concealed lights, and what a stimulation it will give to flood lighting throughout the country.

What the World wants is not large but small contributions, and to be able to say, as it did in its former campaign to provide the pedestal for the Statue of Liberty, when over a hundred and twenty thousand subscriptions were secured, that this fund also was subscribed by patriotic citizens. They want as many small subscriptions as possible, scattered through the nation, and I hope every man in this room will do his share to broaden the scope of these subscriptions.

The World financed by popular subscription the amount required for the pedestal of the Statue of Liberty when a national appropriation and a state appropriation both failed. It

raised something like $100,000. In this particular subscription matter it wants to raise $30,000 in small subscriptions in order to make it a nationwide movement. I urge on all of you to do what you can to make this a patriotic movement which also will result in a grand demonstration of splendid lighting methods. Make it as widespread as possible, and everybody do his share. Get the people in your home cities interested, get them to send their dimes and pennies to the New York World. I have a telegram here from the World which I will read. "If you can get word to a few people to send in fairly good sized contributions we believe it would stimulate things and give momentum. It would be useful right now." Let me suggest that all of you who feel like it, send your contributions to New York, at the same time commending the work and bringing out every new angle. It is going to be a grand demonstration of illumination and it is a patriotic movement as well.

> Don't fall into the popular error of measuring success in life by money getting.
>
> —HENRY L. DOHERTY.

At the banquet to President Wilson, who turned on the lights for illuminating the Statue of Liberty, the speakers included the President, Chauncey M. Depew, Ralph Pulitzer, and Mr. Doherty. The address of Mr. Doherty on "The Science of Electricity," as reported in the New York Times, was as follows:

ASSUME that the word science shall be interpreted in its broadest sense. The great epoch of making electricity the servant of man was ushered in by the discovery of how to generate electricity by mechanical methods. The whole science has been developed during the lifetime of a majority of the men who sit about these tables.

If any one of you has occasion to talk to a body of real scientists, do not loosely repeat the old worn out statement that "the science of electricity is only in its infancy." The science of electricity is far in advance of every other science of its general class.

Every transformation of one form of electricity to some other form of electricity is accomplished with marvelously high efficiency, leaving little to be gained even if perfection should be reached.

But electrical energy must be derived from and converted into other forms of energy, and it is within these kindred and allied sciences that big losses are sustained, and it is these sciences which may be said to be still in their infancy, even though centuries old.

The magnitude of the task before us can only be appreciated when you remember that whenever you see a man, woman or child doing any form of human labor, that that labor can either be reduced or wholly eliminated by the use of electricity. Millions of people every day are fatigued with labor that it is not necessary for them to do. You can state the case in any terms you want: that electricity will make human labor more productive, that it will lessen fatigue; that it will make human labor more efficient; but it all comes back to the fact that every form of human labor can be eliminated or reduced by means of electricity.

> Do the most important thing first, no matter whether it is in order or not. Don't dodge the toughest problem in your business, make a beeline for that very problem.
>
> —HENRY L. DOHERTY.

The Electrical World gives a brief resumé of a talk before the engineering cadets at Toledo in the fall of 1916, as follows:

IN speaking before the engineering cadets of the Toledo Railways and Light Company about the new business department end of the public utilities, Henry L. Doherty remarked: "I believe every engineer should have experience in actual business getting, in putting to work some of the ideas he has stored up in his brain through long years at college. You know generally we study too much and think too little. The man in the selling game has to think, think straight and think

quickly, and I know of no better experience than to have a try at the actual selling of goods. If you make a marked success as a salesman there is hardly a job that you would afterward tackle that you could not finish successfully on account of the experience you have gained in the field of salesmanship."

> Never fear criticism for being over-aggressive; give me the man with too much pep every time. I can put a harness on over-enthusiasm and a curb to check it if needed, better than I can pull a load with a slow horse.
>
> —HENRY L. DOHERTY.

A memorandum on the Doherty method of automatic temperature control was prepared by Mr. Doherty in 1916:

HIS method of automatically controlling the temperature of the fuel bed in a producer furnace, regardless of whether the producer is operating under high or low tension, is based on the principle that the reduction of carbon dioxide in the presence of incandescent carbon depends on two factors; first, time contact; and second, degree of temperature. The reduction of CO_2 to CO is an endothermic reaction, and can only be accomplished by the necessary heat being supplied from some source, which, in this case, must necessarily be the fuel bed itself. By introducing an excess of CO_2 beneath the grade bars of a producer it will be seen that there is an inherent automatic temperature control of the fuel bed. Should the temperature of the fuel bed increase at any particular point, or throughout the entire bed of fuel, the rapidity with which the disassociation takes place is increased at a rate exceeding the rate at which the temperature of the bed may rise, provided the mixture or percentage of CO_2 in the draft current remains constant, regardless of the rate or tension at which the producer is operated. In this manner the temperature rise of the fuel bed is opposed by an ever increasing reduction of CO_2. On the other hand, should the temperature of the fuel bed have a tendency to be

reduced, other conditions remaining fixed, the rapidity of the reduction of CO_2 decreases at a more rapid rate than the fuel body cools off. In this manner it will be seen that for every class of fuel used in the producer, and a certain percentage of CO_2 present in the draft current, there is a fixed point at which the temperature of the fuel bed will be automatically maintained, regardless of the tension at which the producer is operated.

Therefore the invention resides in the condition that an excess of CO_2 is to be maintained in the draft current, which will insure the temperature of the fuel bed remaining at any desired point.

Automatic establishment of equilibrium—start with temperature of elements above ignition temperature of carbon.

> When you are looking around for obstacles to place in the path of reform, don't overlook the pinheaded man who would criticize anything, good or bad, that a corporation might do.
>
> —HENRY L. DOHERTY.

A memorandum on the Doherty method of high temperature combustion outlines the principles of this process:

HE idea of operating a producer furnace wherein the temperature of the fuel bed is considerably above the clinkering or fusing point of the ash, constitutes a new and original method of producer operations. In the operation of certain of my other inventions pertaining to the manufacture of producer gas, blue water gas, carburetted water gas and carburetted producer gas, it becomes necessary in certain parts of the system to work the fuel beds at extremely high temperatures.

No drawings are required for the understanding of this process.

It consists in the method and means of introducing products of combustion with sufficient air to maintain combustion to the

top of a fuel bed. The temperature of the draft current is considerably above that temperature at which the ash of the fuel in question fuses or slags.

The fundamental principle on which this invention depends is due to the fact that the fusible material constituting a portion of the ash is contained throughout the fuel in small particles, and distributed throughout the fuel structure. As the temperature is above the fusing or fluxing point of this ash, the fusible particles are heated to a high degree and take a molten form. As the small particles of fusible material are no longer mechanically supported, they descend downward, or percolate through the fuel bed. Due to the presence of carbon dioxide gas, and the disassociation consequent to the presence of carbon dioxide and incandescent carbon, there is a rapid disassociation or reduction of the CO_2 to CO, thus cooling the lower part of the fuel bed. The fusible globules percolating down through the fuel bed come in contact with this cooler zone of combustion and are frozen or solidified before they are allowed to run together, preventing the formation of a solidified mass which would result in clinkers of large dimensions; the idea being that by this process the fusible particles are removed from the fuel bed, first by being melted and then chilled before forming into clinkers of objectionable proportions.

By this means I am enabled to operate a thick fuel bed on a very high temperature plane, and the combustion is not hindered by the formation of clinkers.

Pride and necessity are the foundation of success. The man with pride will go far, but the man who has had the lash of necessity on his back will go much farther.

—HENRY L. DOHERTY.

Henry L. Doherty and Thomas Commerford Martin at Unveiling of Bust of Benjamin Franklin

1917

America's entry into the Great War was the outstanding event of 1917. In common with every citizen of the United States Mr. Doherty's interest centered in Washington. Petroleum was one of the chief necessities in the conduct of the war. It was also important that every public utility, particularly those serving industrial centers, should function at highest efficiency. The Doherty Organization, leaders in both of these fields, sought in every way to cooperate with the Government. The full story of Mr. Doherty's war work will never be told, but he was in Washington weeks at a time, conferring with Government officials, bending every energy toward increasing America's ability to contribute to a speedy and decisive victory. His research into the composition and production of war gases was continuous and crowned with extraordinary success. His study and analysis of economic problems, especially the balancing of production in various fields, was of particular value. His suggestions as to financing the war was largely adopted, particularly the Doherty plan of thrift, which was developed into the War Savings Stamps. The Doherty Club was opened in Washington for the accommodation of members of the Doherty Organization who were in the city on official business. Meanwhile in every city where the the Doherty Organization was represented Doherty men were pushing the Liberty Loans and savings campaigns. During 1917 Mr. Doherty made only one address, at Toledo, of which no transcript was taken. An analysis of the financial situation is given in a letter from Mr. Doherty to Mr. Thomas W. Brahany,

confidential adviser to Secretary of the Treasury W. G. McAdoo, in which he said:

September 8, 1917.

Mr. Thomas W. Brahany,
The White House,
Washington, D. C.

Dear Mr. Brahany:

I am enclosing you a copy of a letter I have written to Secretary McAdoo.

For your own information I will give you the situation as I see it, giving proper weight, I hope, to the information I get by contact with the Wall Street people, balanced against the information I get in our weekly letters from approximately two hundred cities, villages or communities to which we furnish some form of public service.

(1) There is great apprehension over the effect of the next Government bond issue. If the rate is made too low many people feel that it cannot be sold. If the rate is made 4 per cent or better they feel it will cause a withdrawal of money from savings banks and will cause a heavy depreciation in the market value of the high grade investment securities which bear relatively low rates of interest.

(2) A large portion of the investments of the country are in the securities issued on public service corporations. These corporations are limited to a fixed charge to the consumer, either by rulings of the state commissions, but frequently by a maximum price named in the ordinance by which they have been granted franchises to do business.

Many years ago it was found that individual operation of these public utility companies could not compete with group operation and, therefore, today the public utility companies as a general rule are owned in groups.

The owners of a public utility company in one city are also owners in common of other public utility companies in other cities. Under the state laws each individual public utility company must be a separate corporate entity, therefore, these properties can only be grouped together by means of a holding company.

Amalgamations and consolidations have gone on whereby one holding company may have been absorbed by another holding company, bonds and new securities issued, so that a large holding company may be the owners of a subholding company, and a subholding company the owners of another subholding company, and so on.

Under the new revenue bill it is feared that the earnings of a holding company may yet be taxed several times before it reaches the eventual stockholder. As the bill is now drawn, duplication of taxation occurs if the earnings of each fundamental public utility property passes through more than one other company.

The increased cost of material, together with the threat of heavy taxation, have made the holders of these securities feel apprehensive, and in many cases the income heretofore enjoyed is either threatened or doomed.

Prices have been fixed on normal cost for material, and in many cases coal alone has advanced in cost more than 200 per cent. In many cases public utility companies are forced to supply all the demands that are made upon them. Roughly speaking, the tender of $100,000 of gross business requires an investment of $500,000. Or, if stated on a unit basis, each one dollar of added gross business requires an added investment of five dollars.

Public utility companies have already had their credit so badly crippled that to raise money for additional extensions is impossible, and more and more are threatened by additional government taxation.

(3) Excess profits. Generally speaking, excess profits are only being made by companies which are expected to furnish the necessary materials for our own participation in the war and supply the needs of our allies. These profits will all be paper profits; that is, they will not be in cash, but will be represented by new lathes, new buildings, and in our case, new oil wells.

It has become practically impossible to get money for expanding private business. If the government is to levy a heavy excess tax which must be paid at this time, and paid in cash, it means that the money that should be expended to increase the facilities for production must be hoarded for the purpose of paying government taxes.

We cannot win this war with money alone, but must win it with what money will buy. Any sum of money ever dreamed of by any one to carry on this war can be raised by the sale of bonds, or, rather, I should say that any sum of credit necessary to carry on the war can be so raised, for undoubtedly we will spend, as a whole, more than the entire money wealth of the entire world, therefore, credit must be used directly in lieu of money, or else money must be raised in small amounts and given an opportunity to return to the usual channels before new flotations are made. Heavy taxation will not increase the amount of money the government can raise, but will seriously reduce the amount.

In making this statement I do not want it understood that I am against taxation on war profits, and I think that is almost the universal feeling among the business men of the country, but these taxes must not be of a character which curtails production.

For instance, I am being urged by certain departments of the Government to maintain our work in the exploration and drilling for oil. We never have above ground more than a six months' oil supply. Every barrel of oil that comes out of a well brings that well that much nearer the end of its life. Every barrel of oil that comes out of every oil pool brings that pool that much nearer its end.

New wells must constantly be drilled and new fields must constantly be found to maintain our oil supply, and yet if we are to pay to the Government large sums of money from the earnings on our existing oil wells we cannot in turn use this money to drill new wells or prospect for new pools, nor does it seem possible to get the necessary money for drilling and prospecting from any other source.

Now I want to say a word about war profits and excess profits. I realize that exact equity cannot be done in a tax bill of this character, but it should not be allowed to pass in a form flagrantly inequitable.

In the mountains of Colorado you will find hundreds and hundreds of prospectors. Some of these men work all their lives without ever making a strike. Others may work for forty years and finally be rewarded for their search. The man who searched for forty years and happened to make a strike in 1915 should not pay an excess profit tax, simply because he was not fortunate

enough to have made his strike prior to 1911, 1912 or 1913. He should not be taxed on anything but that portion of his profits which will be war profits. If he is taxed on all excess regardless of whether it is war profit or not he is paying an unjust share, and when the war is over and when the United States Steel Corporation, the Bethlehem Steel Corporation and the DuPont Powder Company have ceased to make war profits and are no longer paying any taxes to retire such amount of bonds as are still outstanding, this man will still be paying for the retirement of these bonds, simply because he was being taxed, not on war profits, but on peace profits that were a legitimate reward of forty years of search.

There are hundreds of examples which in a general way represent the one I have described above. Many of these men will smart with a sense of injustice, but there is still another side, and a very practical one, and that is this: Who is going to attempt to bring in additional mines and additional oil and the other things the Government so badly needs if they must bear all of their losses if unsuccessful, and yet will have practically all of their profits commandeered by the Government if success crowns their efforts? The answer to the above criticisms is more or less obvious.

Corporations which are serving the public at a fixed contract price are already contributing more than their share to the conduct of this war and should not be expected to bear added burdens, and under no circumstances should they be subjected to a duplication of taxes on the same earnings. Excess profits should not be taxed, or if taxed, should be only lightly taxed. War profits may be taxed up to the point where production is discouraged, however, provision should be made that the payments of these taxes to the Government may be deferred if the money is needed for increasing the facilities to produce the things that we need to carry on this war.

Now for constructive suggestions.

Our country has never excelled in anything except due to the genius of our great minds. There is no class of Americans who do not number in their midst some who would like to take a selfish advantage in making profits from this war. but the great majority of men of small, moderate and great means are thoroughly patriotic, and many of these men would be willing to

lay their own fortunes on the altar of sacrifice to insure the success of this war.

This war is largely one of psychology, especially in view of the Russian situation. It is largely a matter of encouraging our allies and discouraging our opponents. We do not need money to win this war, but need the pledge of credit. We will spend from first to last a larger sum than the entire money wealth of the entire world, and perhaps many times over. I believe it would be possible in thirty days to secure an underwriting for the purchase of Government bonds of forty to fifty billion dollars. Such a huge underwriting would perhaps do more to win this war than the sacrifice of a million lives. We are conscripting young men and jeopardizing their lives. We will sacrifice what portion may be necessary to win this war.

It would be an entirely practical scheme to secure a pledge of property and securities of a sum more vast than our opponents could dream of, which would, in turn, be used—or such portion of it as was necessary—to win the war. If we would underwrite a vast bond issue for the use of our Government it would solve many of our other troubles. It would permit capital to flow to needy private undertakings. It would reduce the necessity for drastic taxation and its immediate collection when the money was needed to produce the real materials necessary to win this war.

If you can interest any one in this plan I will attempt to supply them with a perfectly workable and feasible plan.

Now a word about expenditures and expenses.

The money we raise for this year may be divided into three parts.

(a) Moneys loaned to our allies.

(b) Expenditures on capital account.

(c) Operating expenses.

Of the money loaned to our allies, presumably this will all be returned, and there is no need to levy taxes to repay it.

The money spent for capital account, such as ships, for instance, will be a permanent investment, which must only be charged to operating expenses as the ships are destroyed or to lessen their original cost to keep pace with their future use, due to the cheapening of material or to wear and tear, therefore the only money that has to be raised is the money we need for

operating expenses, and this need only be raised as it is expended and not as it is appropriated.

I am convinced that the expenditure for money for operating expenses in this war will be much smaller than is generally anticipated. The time required to produce the things that are needed will be longer than expected and it will be a long time before any great sums have been expended.

I see no reason why we should strain our whole social system to pay these expenses in cash rather than to draw to a reasonable extent on our credit.

We say we are fighting this war for the freedom of our children. It might legitimately be urged that they bear their portion of the burden for the benefit they will receive, but this is unnecessary, for we can pay all of the operating expenses of this war in a matter of, say, ten years.

To pay the interest on the portion of the money expended for our operating expenses and extinguish each year one-tenth of the indebtedness incurred would not be a heavy task, and some such reasonable course as this would materially assist in keeping prices down on all commodities and would greatly lessen the burden on the great mass of our people.

Many of these heavy taxes proposed on business are bound to be passed on to the consumer. Excessive taxation on business will result in added burdens to the great mass of our people.

Yours sincerely.

HENRY L. DOHERTY.

This is the day and age of opportunity, and we live in the country of the greatest opportunities. Opportunities must pass each man's door not once, but often. But opportunity is not apt to stop and knock at the door of the man who is but an indifferent workman.

—HENRY L. DOHERTY.

The letter to Secretary McAdoo, to which Mr. Doherty refers in the above letter to Mr. Brahany, was as follows:

September 8th, 1917.

Hon. Wm. G. McAdoo, Secretary,
United States Treasury,
Washington, D. C.

Dear Mr. McAdoo:—

I did not tell you the part we took in the last work on the Liberty Loan, simply because I was not looking for praise for it, and I tell you about it now so you will understand what I am about to say.

When the last loan was announced it came so suddenly that it did not occur to me to formulate any plans for several days, but long before any organized movement was made for pushing the loan we organized our employees throughout our various public utility properties, and through our connections in these various cities we endeavored to organize the cities themselves for the flotation of the loan. We contributed in many ways besides this, including an agreement with Publicity Director Wooley to pay the expense of the Ruth Law flight.

Knowing that another loan would have to be floated sooner or later, we have tried to keep our organization in working shape.

We now supply some form of public service to over two hundred cities, villages and communities in the United States and Canada—principally, of course, in the United States. We keep in touch with all of these properties through weekly letters.

The information which I receive makes me extremely apprehensive regarding the success of the next Government Loan. I never like to be the bearer of pessimistic news, but I feel it to be my duty to tell you that at the present writing my sources of information are not at all encouraging.

I never like to contribute a sour note without offering some constructive suggestion. I have given considerable thought to it and a number of different plans have occurred to me, all of which, however, have probably occurred to yourself or your immediate associates.

I think it would be possible to coin a plan whereby this and future Government loans could be underwritten to the extent of forty or fifty billion dollars, and such a plan would not only

solve the difficulties which now confront us but would have a great psychological effect in encouraging our allies and discouraging our opponents.

Should you at any time want me to discuss the plans as to how I would go about this with any of your representatives I would be glad to do so.

The situation at the present hour is anything but encouraging. I realize, however, that marked improvement may and probably will occur before October 1st.

Yours truly,

HENRY L. DOHERTY.

> The next time you are tempted to waste your time on a book of fiction take the Encyclopedia Britannica and turn it page by page until something of interest strikes your eye.
> When you finish the last volume start again at the beginning if you are still tempted to go back to fiction.
>
> —HENRY L. DOHERTY.

On December 20, 1917, Mr. Doherty was in Toledo and was invited to speak to the students in the School of Gas and Electric Practice at one of their regular meetings. This is one of the schools maintained by the Doherty organization for the practical training of college graduates in engineering. Mr. Doherty said:

I AM glad to be here with you tonight. I want to demonstrate my interest in this meeting but I have nothing to say. I was interested in what Mr. Dicks said about the men making up their own programs and then have them get up and talk. It was a long time before I could stand on my feet and talk before an audience. I guess the older you get before you try to do it the more difficult it is to do so and even now I have stage fright in spite of the fact that I have talked before a great many audiences. When we get stage fright we are very apt not to make a very good talk and apt to embarrass the man you are trying to get across.

I don't believe very many men realize how much they do with their voices and I believe this is the first winter I have gone without losing my voice up until this time. One winter I lost my voice entirely and could not talk above a whisper and so I concluded I talked my way through life. As a rule, I catch a cold in the early winter and am not able to speak above a whisper. Three or four years ago I had one of these spells and came near having pneumonia. After the attack was over I could not speak above a whisper but was called to a meeting to which I went. After hearing my husky voice they gathered around me and said, "You should not be out today but be at home getting that voice back." Some others who were well acquainted with me replied, "We don't want him to get his voice back; this is the first time we have had a chance to talk in ten years."

I want to encourage every one of you and every time you get a chance to talk before an audience, take advantage of it until you can express yourself as well on your feet before an audience and with as much ease as you can dictate to a stenographer.

I am glad to be here and it is a great source of satisfaction to me to feel that there are new men to be trained to take the vacant places that have to be filled from time to time, and whether you feel that you are being watched or not we are always looking for good men, and I hope the history of the organization will always be maintained and that they can use all the good men they can get. I feel that is true under the present conditions. We have lost a great many of our men by going to war. We should plan on what our work is going to be when the war is over and I do not know of a time when we have had as enormous a program laid out. We need all the men we can get to carry it through.

I sometimes wish I had, at odd moments, tried to make myself a little more proficient in the matter of mechanical operations with my own hands. I sometimes think it gives the man a confidence and a knowledge of how to do things.

One of the things I want to say is that we have got some very important work to do on the matter of getting our business on the proper economic basis. It is perfectly idle to try and sell

gas or current at so much a kwh. That is only one of the things that goes to measure the expense you are put to, to serve a customer. Your charge must always be no more than its value to the customer and should always be at least as much as the cost to the producer. That gives you the minimum and the maximum of charges. If a dentist is using current for dental purposes, that current is worth $1.00 a kwh to him. He could not substitute anything else for it to produce his own energy.

You should charge at least as much as the cost to produce and if the charge exceeds the value of the service to the customer you lose out.

If you men want to study the question of electric rates you will find a paper written by Dr. Hopkinson which goes back into the ages. The case is in 1892 and this paper of Hopkinson's today is one of the best papers that has been published.

My first paper on the rate subject was presented at the National Electric Light Convention at Chicago in May, 1900. At that time I intended to use this paper as an introduction of the subject and had been working on it for quite a while but my paper fell so flat I never followed up the work. I had a uniform customer charge. Then each consumer was to pay an additional amount, depending upon the maximum rate at which he wished to demand current and then he was to pay me a low rate per kwh for the current he used.

Doherty & Company have, the past few years, been interested in the natural gas business and we are now the largest operators in the world. That place has been held by the Standard Oil Company but we are now the largest producers of refined oil. My experience in natural gas has led me to believe that it is wrong to allow a man to come on to our lines and allow him to take any current and let him use it without record of what he takes. It is rank folly.

We believe that almost any one can make gas cheap enough so if it was sold on a good load factor basis we could substitute gas for solid fuel and we expect to do it.

When a customer comes onto our line he must agree to pay a certain demand charge and have his demand limited for what he pays. This charge will probably be $6.00 per consumer plus a demand charge of $18.00 per hundred cubic feet for natural

gas, and $12.00 for artificial gas, but we intend to go over this with the intention of asking the authorities to abandon the idea of specifying the B. t. u. per cubic foot. There is a belief on the part of many people that the value of the gas is greater if it has a high B. t. u. per cubic foot. That is not true.

We are going to ask the authorities to abandon the absurd way of stating it, that you must have so many B. t. u. per thousand cubic feet and we propose to measure our gas in B. t. u. delivered.

I do not intend to go clear into the matter of the methods of charging for gas, as it is a long subject. There has been so much written on it that I have never read it, and I believe a man can do more by thinking than he can by reading. There is much written on that subject and so much is foolish that I think you will learn more about the theory of charging for gas and how it will work out by simply trying to think about it than you will by trying to read about it.

We used to have one man in our employ who used to write a great many volumes about it but I never felt he was very sound on it. This is the only essential thing to enable us to make central station service almost universal.

I think it is well to look death fairly in the face and frequently. That is the way to get used to the thought that it is only a matter of time until it will catch up with us. It will teach us how to die, but better still it will teach us how to live.

—HENRY L. DOHERTY.

War Savings Meeting, New York, July 31, 1918.

1918

After nineteen months of American participation, the war was ended, but not the problems connected with it. Adjustment of taxation became an increasingly difficult question, to which Mr. Doherty gave a great deal of attention. National demands for petroleum and petroleum products had caused a phenomenal expansion of the Cities Service Company's oil division. Coupled with the development of oil fields was the matter of proper conservation of natural gas, and Mr. Doherty was frequently in the Middle West getting first hand information. On one of these occasions he was the guest of honor at a banquet of the Inter Community League of Kansas City, where he spoke on "Industrial Development of the Southwest."

KNOW how amateurish it must seem to start a speech with an apology. I have made but two speeches during the last year. On neither one of those occasions could I really plan any particular thing to say, simply because, like many of you men, I was so much interested in our war work. I got an invitation to come out here to this meeting, and in spite of the fact that I had many demands on my hands I was glad to come. I was glad to come because our interests are large around Kansas City, but primarily on account of the atmosphere and on account of the feeling that out here I am at home.

I have been introduced to you as a Wall Street man. I don't know whether you realize how few Wall Street men are New York born. I often wonder how many men, even among the men who go to Wall Street and tramp up and down that little alley, really know what Wall Street is and what the Wall Street district is.

The picture that the people of America have is a street that leads to a stock exchange. Everything is dealing in stocks on margins, everything is speculation, everything is manipulation. The truth of it is that Wall Street is just a sort of common center

for the transaction of certain kinds of business, and many kinds of business, just such as in some old street here in Kansas City which was once your haymarket. If a man wanted to sell a load of hay he knew the man who wanted to buy it would go there. So that was where they met.

I wonder how many, even of the old New Yorkers, know how Wall Street got its name. When what is now New York was first settled by the Dutch there was a wall built of wood that then stood about 90 feet north of the present south building line of Wall Street. It was put up largely to keep out the Indians. There was one gate at what is now Pearl Street, known as the Water Gate, and another gate known as the Land Gate that would now be at the corner of Nassau or Broad Street and Wall Street. And, by the way, when you read the early Colonial and revolutionary history of America you see, according to our history, an important part was played by Boston and Philadelphia. But if you study closely you will find it was little old New York that played the most prominent part in our revolutionary and Colonial days. But New York City never claimed credit for those things. It never has seemed to have the city pride. Yet, in spite of that, Wall Street has grown. That brings me to another subject which interests me very much.

I have often said of late years the only thing that keeps me in the public utility business is an early ambition and pride. As a boy I swept out the office of one little public utility. I had an idea then I would like to do things my way. That was how I come to be in the public utility business. One of the first things, I decided that would bring success in the public utility business was to pick out that city that was going to grow and going to prosper. Then, I figured, I would have an easy time in the public utility business. So, like nearly everybody else, I began to look up the natural advantages of different cities. And I kept on and I kept on and I kept on. Every day I appreciate more and more the fact that it isn't natural advantages that wholly go to make up cities. Very often a city exists and you can hardly see an excuse for it; yet it becomes a dominating city. Other cities don't grow in relation to their natural advantages. So you must look for something more than the natural advantages to explain the growth and the prosperity of some cities. You must look for the men. One man, perhaps in one community, can give that

city or that district the impetus that rolls up and makes it a wonderful city; while some other city of greater natural advantages never is able again to equal it.

For twenty years or more we have passed through a period when the matter of making an attack on business has been everything from a profession to a pastime. At the outbreak of this war, when we commenced to realize how much we needed our business facilities, how much the crippling of our railroads meant, was the first time in my career as a business man that people commenced to appreciate the value of suggestion.

You know we haven't thought for years about anything but the cost of service. There are two things which must always fix prices. One is the cost to the producer, the other is the value to the user. It is marvelous what a world of difference there can be between the cost of the producer and the value to the user. It should be both of those things on which all charges should be based. It is on both of those things the customer should figure whether he is paying a proper cost or he is not; because for years we have not thought about anything but just simply the cost of service to the end of shading it to the last penny—to the last fraction of a cent.

I agree with Elbert Hubbard that we are not so much punished for our sins, but we are punished by our sins. In this campaign in which business has been attacked all the way from the joke book to the professional rater; we have allowed it to go on not realizing what punishment it meant for the people in the end. I have made up my mind now that when I can and where I can I am going to speak for an appreciation of what business means and what big business means.

I believe in the philosophy of business. I would even go so far as to say, as I have said before, that I believe Andrew Carnegie was a greater philanthropist as the greedy iron-monger—as he was painted—than as the professional philanthropist. I believe he did more good in the first instance. The foundation stone of business is to supply some service or some commodity at less than its value and at less than it could have been supplied for before. That is the only sound foundation stone for business. It is to do more for the customer than is done for the stockholder. The business that is created does more for the user than it does for anyone else.

Let us take an example. Part of my business has been the development of water-power properties. Another part of it has been the development of gas properties. (When I draw a personal example I do it simply because I am familiar with those things.) But let us assume we go to some distant city which is now paying a dollar a thousand for artificial gas and we bring in natural gas at a cost of, say, forty cents a thousand. Two cubic feet of natural gas are worth three cubic feet of artificial gas. So the man who has heretofore been using artificial gas and paying a dollar a thousand for it or paying three dollars for three thousand cubic feet, now buys two thousand cubic feet at eighty cents. Before the company, before the business has a chance to earn anything, his bill has been cut from three dollars to eighty cents, a reduction of two dollars and twenty cents out of three dollars. The same thing is true if you build a water-power plant. You find a man within the radius of the water-power plant with current generated perhaps by a gas engine or a gasoline engine, or in some way which costs as much as fifteen cents a kilowatt hour. But in our present business methods of one price to all, or discrimination only as difference in service justifies it, and no bargaining between customer and customer, a waterpower company comes along and says: "Here is current for you now at a cent a kilowatt hour." The user has saved fourteen cents before the man who built the plant gets a chance to get a run out of the one cent.

Let us stop and think what the railroads of this country have done. Do you suppose you can point to any one of the great railroad systems which did not create more values than the entire cost of the railroad—and created them for other people, not for the railroad? I remember well when the Pennsylvania Railroad started its tremendous system and bought up the Long Island Railroad. I said then to myself: "Of all these millions that the Pennsylvania Railroad is going to spend it is creating values for other people running into many more millions; and yet the day will come, when the very people who have profited by the enterprise and by the facilities that are furnished by the Pennsylvania Railroad will say: 'Why, you are entitled to no unearned emolument; you are entitled to receive a nominal return, a return on the actual physical value of your property and nothing more.'"

This little pastime of being a friend to the people or professional friend to the people is an interesting thing. The hardships we will suffer in this war are due largely to the man who has based his career on his pretended friendship for the people. I am going to watch every man hereafter who is the people's champion, and I am going to gauge him largely by whether he really intends to do anything himself, or whether he just intends (if he can get enough votes or enough backing, or whatever he wants) to promise to give to a lot of voters something that belongs to somebody else, but nothing that he has.

Now we have followed this kind of people for many years. Every time we commenced to get the real measure of one of them, there were three more on the horizon coming along. We chased all of their fads, we sent them to Congress, we sent them to the Senate, we boosted their newspapers, and we boosted their games; and there never was a time when they wanted peace and harmony. They always wanted turmoil and they wanted an issue.

I am afraid that if I had to describe the modern reformer with which I have lived—and I have known most of them personally—I would say that they were men who were so unconscious of their duty to their fellow men, or who were so selfish that they were willing to use the great, big human problems as so many brick bats out of which to build a pedestal so they could get their shoulders above the balance of the crowd.

Now let us see what has happened to the men who made a pastime or a profession of building their own careers at the expense of our railroads. Mr. LaFollette was one of the men who achieved a great deal of his heretofore fame and friendship on that issue. When railroad fares were three cents, he said: "Why you are paying too much. You ought to pay only two cents. If you will do this and that and elect me governor, I will give you two-cent railroad fares. I am a friend of the people. We will get these railroad fares down for the wage earners." I watched the game go on for a great many years. I always knew it was going to lead to trouble for the people, but I never realized how much trouble it was going to lead to. If I had I would have talked more and would have made myself more unpopular. You know that campaign against the railroads made railroad building very unpopular. For a great number of years in this country

scarcely a mile of independent railroad was built. It seemed to me that the whole problem was one that should have been obvious to everybody. Here we were a growing country, with more mouths to feed every year, more backs to clothe, more people to shelter, and yet we were doing nothing to open up new lands that would produce food, produce shelter and clothing.

The biggest part of the railroad fares in this country are paid in some way, directly or indirectly, by commercial enterprises. The wage earner rides but little, and for every penny that we saved him—up to the time the European war broke out—in riding on railroads, we cost him ten pennies in the price of food. With our own war on our hands, with the whole business of the county congested and retarded for lack of proper railroad facilities, because our railroads did not grow with our population; I don't know what the cost will be. I know that there has been suffering, there has been enormous loss and enormous cost. Whom have we got to thank for this? These men who have undertaken to lead our people and tell them what they ought to do to big business enterprises, the men who made a profession of attacking business, criticizing business. They are the ones whom we must thank for this crisis that is upon us. Business hasn't suffered as much as the public. The man who is the real friend of the people wants to stop and think that when you persecute business it is the consumer in the end who pays the freight.

You know, gentlemen, we have heard a great many startling things about the German propaganda in this country. I didn't believe some of the things I first heard. Yet now I know that they are true. In examining the nature of German propaganda and where it started, I think we ought to go back a long way. It seems remarkable to me the great number of men who were found to be on the German payroll or German sympathizers, and also were the men who attacked business for years before the war broke out. Now I don't know which was the knave, and I don't know which was the fool, but certainly if some foreign power was jealous of our industrial progress or even anticipated the possibility of a war; it could have done nothing better than to have crippled our railroads and crippled our business enterprises. When we are looking for the origin of German propaganda, let us look away back and see where it did start. I think we may learn some things about the attacks on business

and why it is done. While Germany fostered her business and had a great many efficient, industrial organizations to call on when war broke out, American industrial organizations were largely loaded to the breaking point, and her railroads were loaded in many cases past the breaking point. That is the condition in which we entered this war.

We talk a great deal about capital and talk a great deal about labor, but my experience has been that capital and labor are wonderfully impotent by themselves. There must be that other element, the genius for business organization.

I find that outside of New York City they speak of the man who can bring capital and labor together, etc., as a promoter. If you want to flatter a man from Wall Street, or some big business man, don't call him a "promoter," because a promoter in certain business circles means the man who furnishes the conversation. He is the man who always has the mine in this pocket and something else in that pocket, and if you don't want to buy a mine that day, he will sell you a bunch of cattle, or sell you some public utilities gathered from this pile. He is a professional option getter. One definition is: he is the fellow who will furnish the ocean if you will furnish the ships. Any country has both capital and labor to do anything that it wants to do, and most countries have enough natural resources. But it is the man who stands between; who is able to get capital, who is able to handle the labor, train it, organize it, and everything of that sort that is the important man in the development of our country, and in the development of all of our business enterprises. Yet, as a rule, we talk only of capital and talk only of labor.

I am compelled, Mr. Toastmaster, to make this speech a very sketchy one, because I haven't had time to plan it in proper sequence. I want to compliment you here on the idea of this Inter-Community League. All my life I have tried to conduct my business affairs, not along the line of competition, but along the line of creation. I don't care to be known as a good competitor. I want to be known as a good creator. I have often watched the activities of many of our boards of trade throughout the country, and I have wondered how much of their work was creation and how much of it was competition. I have had amusing experiences in some of our own cities (and, by the way, we supply some form of public service to about two hundred cities,

villages and communities throughout the United States and Canada). Very often we are asked to subscribe to a board of trade that is going to locate an industry in a certain city, only to find they are bargaining with an industry in some other city we are interested in.

So I am a believer in these inter-community leagues for a great many reasons. First, you have a great many problems that affect you as a community, not as a single city. I am a great believer in getting acquainted, a great believer in knowing people. I think if we were all well acquainted lots of the mean things we do and say and think we never would do and say and think. I think the efforts of our boards of trade should always be a question of creation as far as possible. I think that this war is going to bring back to us the necessity of carrying the board of trade idea more nearly to its original and direct purpose, which was the creation of business and the building of business rather than the curtailment and regulation of business, as has often been the case in some communities.

When I speak as I do about the regulation and control of railroads, the interference with business and one thing and another, I want to disclaim that I speak in any personal sense. We have been remarkably fortunate in our relationships with the public. Perhaps we have got more than we deserve. I know that we have never suffered much. We have never suffered much, but we in common with everybody else have suffered from the attacks on the railroad and many of the attacks on big business. I think the divorcement of the Western Union Telegraph Company and the Bell Telephone Company was an economic crime—the thing that made it impossible for us ever to have either the best or the cheapest telegraph and telephone service. And yet the spirit and teachings of these iconoclasts were what made that necessary.

I am a believer in your particular district here. You know I never was able to reconcile my ideas to some of the conventional and traditional ideas. That is the reason I have got along better than I otherwise would. There is a feeling that an agricultural center can never be an industrial center. When people talk about locating an industry they all say: "Let's go off to some industrial center to do it." I can't quite see the theory for that. I can't quite see why we should if the class of material is such that the man has to have more food hauled to him by railroad train

than his product would represent when it is hauled away, and much of it has to come right back to the agricultural center. I can't see the theory of always chasing for an industrial center, already overloaded, and that type of labor already in great demand, rather than creating these industrial opportunities in the agricultural centers. I wonder how much food is hauled from this particular section of the country to some so-called industrial centers, say New England, to support men who, in turn, are manufacturing stuff which, in turn, is shipped back out here. There is a lot of it. I am a believer in this particular section, largely because I think the day will come when people will realize that many of the industrial commodities can best be made in agricultural centers. Now that may not be thoroughly appreciated for a long, long time, but I think men are appreciating that more and more every day.

Since this war broke out and since we were drawn into it, I have had a sort of fever to get into it, such as characterizes the sons of many of my friends. I commenced to figure if there wasn't another way I could prove I was of draft age, I could do it because I had the fever. But at the outbreak of the war I naturally felt I would like to be in a position to contribute as much as I could and feel I had done my share. I have worked as an engineer, I have worked as an organizer, I have worked as a business manager, as a financial man, and I have been compelled by force of circumstances to fill many different occupations in life. When the war broke out I tried to study out how I could be of the most service to the government. I concluded I could be of the most service in my capacity as an engineer. So I have worked diligently and have spent every moment of my time that I didn't have to put upon my own business on government work. Lately I have been working with them and trying to help them coordinate and organize their departments. While I have been working on that problem I have often felt that in some ways it would be easier to go out and coordinate and organize the outside factors that could be of service in this war than to carry on the organization work down at Washington and try to make it 100 per cent. perfect.

By way of preface for some of the things I want to say, I will state that prior to the outbreak of the European war I did practically all the financing that our corporations had to do in

the European markets, and to do that meant a study of European conditions for a great many years prior to the time we commenced to raise money in those markets in any great amounts. I have at times almost lived in Paris and London, and I have spent a great deal of time in Germany. We finally opened up the European markets for our securities, and we sold many millions of dollars worth of securities over there. It proved afterwards to be the most harmful thing we had ever done, because with the outbreak of the European war, we not only then had to make American markets that would furnish us with new capital, but we had to buy back practically every security we had ever sold in Europe. Outside of four or five million dollars, one of our particular securities which is held under this British loan, practically all other securities that were held in France and England have had to be brought back and refinanced in this country; a sum of money representing fifty or sixty million dollars.

I have a great many friends. I have friends in the armies of England, France and Italy. I did have friends who are now in the German army. And, incidentally, the man who is at the head of the technical division for the German government was at one time a personal friend of mine. I have, therefore, had an interest in this war prior to the time our country was drawn into it that few men did have, knowing men who are in it, losing friends before we got into it, and knowing more or less intimately the condition of those people and the conditions that prevailed prior to the time this war broke out. The great pinch in Europe in the financial world came in March, 1913, when the Kaiser came out with his two hundred and fifty million dollar call for recurring property tax. That was taken throughout Europe as a signal for a European war, and yet we paid no attention over here, did not even know the effect it had on the financial market; except as we got bombs from the European markets when they called in our loans and things of that sort. That was one of the things that put the finishing touches on the preparation for the war that was to come. There can be, in my mind, no doubt at all about that.

From the time the European war broke out I was an advocate of preparing ourselves. I am still an advocate of that to a greater extent than we are doing. I have been very unpopular in many of my views about the whole situation, and I am still in an un-

popular position. When everybody was talking about this being the Kaiser's war and the Big Prince's war and the Little Prince's war I said: "Don't you believe it, it is the German people's war." The German people had come to the point where they had such an exalted idea of themselves that they thought they could lick the whole world and carry on business as usual. I hope the time will never come when our people are as conceited and over-confident as the German people have been for many years. On the other hand, I hope the day will come when our people will be as thoroughly prepared for war as the Germans have always been.

Now the last thing in the world any of us ought to do is to criticize our government or repeat needless criticisms. The two things that will dishearten our people in this war more thoroughly than anything else are: First, a belief the government is carrying it on in hopeless inefficiency, and second, being subjected to the greatest profiteering. On the other hand, we must not be unmindful of some of the fundamental facts. I don't know why, but for some reason or other the general belief in this country is that government work is efficient. That seems to imbue everybody. My statement to you is—after the closest sort of contact with every branch of governmental service ever since I was quite a young man—that governments never were efficient and never will be. It is inherently impossible for them to be efficient. The one and only consolation I get out of this war every time I think of what we might be doing that we are not doing; is that I think we have only got a government on the other side to fight. One of the greatest things we could do for our people is to get this notion out of their mind that governments are efficient; whether municipal, county, state or federal. They are banefully inefficient over any period of years. They may do one thing well, but never everything well.

We are very apt in this war not to notice the things that have been done well, but we notice the things which are interrupted and are delayed. Now certainly we must not shut our eyes to those things, but we must be conscious of much of the splendid work; and we must do all we can to help the government. Now some run down there and say: "What shall I do? How can I be helpful?" Well, I suppose you have been busy lots of times when your wife or some other woman came around and said: "Can I help you now?" Or a lot of kids come around

when you are trying to do something and want to help. That is just about how much good a lot of these men are doing when they are trying to help in that way. But there are sensible ways where you can help and get down to the basis of things. It is well to recognize a few fundamental facts.

I suppose there are men in this audience who will tell me one American can whip two Germans. I don't know whether it would be safe for me to tell you what I really think, but I think it remarkable if one American can whip one German. I know you have big men in this room, who even thought they have had some experience in baseball, but if you were to pit them against the New York Giants, every man of whom is a veteran and has played ball for years, you know about how they would come out.

Every German has been educated in military work from the time he was a baby and is thinking during this term during his whole life what he would do under this or that circumstances. The biggest mistake we can make is to underrate our job, and the biggest mistake we can make is to listen to these bumptious fellows, who aren't doing any fighting themselves and aren't doing much else besides bragging. I believe America has never won out in anything except on two points. One is her genius for organization. In spite of the highest price wages in the world we can lay down an automobile in any man's country for less than that country can produce it for; and it is only done on account of our genius for organization. We can sell clocks and laces in Switzerland, and with all the handicaps of high-priced labor and people who are trained to a short and easy day, we are able to do something on account of our genius for arranging the work and carrying it on expeditiously.

There is another point wherein America shines besides genius for organization, and that is our genius for invention. You take these two things away from us and then tell me what sort of a record we would have made on almost anything else.

If somebody comes around to see me and says, "Let's play poker," and I know he is a good poker player, I say, "No, let's play croquet." And if I knew he was a pretty good croquet player I would invent some game. To my thinking (and I don't want to say a word that will detract from the splendid valor

of the French and Italian and English), but way down deep when I have talked to those men the only thing they have ever seemed to be thinking about was holding the Germans. I don't believe that will win battles. I don't believe that will win the war. When we go into this war I want to see us go in not with a foolish bumptious boast that we are going to win it, but with reasonable confidence that we are going to win it.

The way we are going to win this war and the only way we are going to win it is teaching the Germans a new game—starting a new game for them. So far we feel pretty well content to trail. We have got to organize, independent of our government. The business interests of this country have got to organize, independent of the government. It is idle to go down there and say to them: "Here are our facilities; here we are. What do you want us to do?" You are just in the road. Suppose a fire would break out and everybody ran up to the chief and said: "What do you want us to do? What do you want us to do?" It would, perhaps, hinder more than it would help it. Now we have a fire to put out and many of the things we can do are perfectly obvious.

When I went to Cleveland the other day after being in Washington my old friend, Otis, was president of the Board of Trade. Otis is an old friend, a good fellow. I went there at the last meeting over which he was going to preside before he went out of the office. When he found a little bigger crowd than usual he said to me, "Oh, they are purely curious. You don't know these fellows. They are not expecting to get a good speech."

I said, "No, you forget this is the last time you are going to preside and they are here to celebrate."

But the work the Cleveland Board of Trade and our friend, Otis, has started is splendid. Prior to the time Otis started this work the only things I had seen come out of Cleveland was a circular issued by a man by the name of Mr. ———. It has been printed and reprinted all over the United States. It is a circular largely along this line: "Business as usual." He went on to show how the man who bought a $3,000 motor car was just as patriotic as the man who subscribed for a $3,000 Liberty bond. He made a pretty good and effective argument.

You can divide the people now into two classes—the men who want to carry on business as usual regardless of the war and

the men who want to stop all business and just do war work. When you find a great argument and nobody getting any place, you can generally bet one man is wrong, and almost generally bet both men are wrong. That is one of the cases where, I think, both men are wrong. But we as business men are to-day to employ our facilities and our labor and everything we have for production, as far as we can, along the lines of war work. Beyond that keep it busy; because there is no more flagrant waste than to have facilities idle and labor idle. We don't want the condition to become any more exaggerated than it is. We don't want a condition to arise as it has in some places in which one city has no room and it wants a thousand or two thousand or four or five thousand more laborers than it has and it hasn't the houses to house the labor it already has, while some other city has idle labor and idle houses. Therefore, it is up to every city in this country, and especially those cities in the industrial centers, and it is up to the boards of trade to get back to the fundamentals of a board of trade and to so know their city and know their facilities and know what the government wants that they may know where they can be useful. If they did nothing more than go down to Washington and get exhibits of the many things Washington wants to buy and needs production on and brought them home to their people and said: "Can you make this or make any part of it?" it would be a way in which they could be helpful. They cannot be helpful running up to the chief of the fire department and saying: "What can I do to be helpful?"

Our problem in this country is largely labor, of course. Our problem is to get more labor. It can only be supplied from one source and that is from the women. One of the principal reasons we haven't more women labor is because many men feel it is a disgrace to have their wives or daughters or any of their relatives work.

We want to get over that and get over it at this time. Another foolish idea is that a lot of work which men now do cannot be done by women.

I might tell you that prior to the Civil War pretty nearly every dry goods clerk was a man and nearly every school teacher was a man. Now those are women's jobs. After this war is over many of the jobs we now think are men's jobs, especially operating light machine tools, you will find are women's jobs.

The Cleveland Board of Trade has virtually organized all their means of production and also organized their Engineer's Club, in order that every man who has a notion about how to win this war, every inventor, may have an opportunity to come before the technical board, which they have established there. The situation in Washington is rather curious. I suppose there have been ten thousand suggestions about how to catch submarines with an electro magnet; but the men who made the proposals did not know anything about the very limited field of an electro magnet. Having so many impractical suggestions, our government officials, I am sorry to say, became intolerant of almost any suggestion brought to them. Perhaps now one bringing a brick of real twenty-four carat gold might not be recognized on account of the number of fool suggestions they have had to listen to. Many of those suggestions have been made by business men who didn't know their physics very well. If they had taken their suggestion to some man in their own local community who was thoroughly informed on the subject they never would have gone any farther.

So, as far as Washington can do business through your Board of Trade as a Board of Trade, through your Chamber of Commerce as a Chamber of Commerce, you are helping the war work and helping it immensely.

I will not take any more of your time, gentlemen, and I thank you for your attention.

The reason a rich man is never satisfied with the size of his fortune is not necessarily because he has acquired a kind of hog instinct, but rather because his knowledge of affairs and his breadth of vision have become so much greater that he sees bigger and bigger things that he wishes to do; and his ambition to accomplish things is always a few leaps ahead of his capital. The richest men in the world are usually the heaviest borrowers because they are in a position to see the most to be done. As their business abilities develop it takes larger accomplishments to satisfy them.

—HENRY L. DOHERTY.

In its issue of April 26, 1918, the Kansas City Journal published the following editorial on Mr. Doherty's address to the Inter-Community League:

HEN a successful financial and industrial organizer and executive stands before a group of business men and tells them the truth about the industrial dangers that threaten this nation, it is not difficult to recognize the qualities of courage and native leadership that make that man successful. Thus there is afforded an insight into the character of Henry L. Doherty through this very test that could never be gained by the mere contemplation of his business activities or the annual statements of his various industrial enterprises. For a long time Mr. Doherty has been well known to the people of Kansas City, but he was never intimately known or sympathetically understood until he came forth and scientifically flayed the fake reformers, the demagogues and business baiters who are now doing so much in America to help Germany win the war.

Mr. Doherty's address before the members of the Inter-Community League in Kansas City the other evening was a courageous uncovering of dangers that have lurked in the American business world for years. There was no effort at oratory or the clothing of virile ideas in soft words. In characteristic fashion he went straight to the heart of his subject and gave his hearers the unimpeachable evidence of truth in all that he said. "Professional friends of the people, and would-be reformers who seek to elevate their shoulders above the crowd by promising to deliver to the voters things which are not theirs to give," said Mr. Doherty, "are responsible for the disorganization of finance and industry which is slowing America's war pace today." And it is worth while to continue further in quoting Mr. Doherty's words: "At the moment when the German empire was forming the most perfect industrial fabric in the world, misguided men were stirring up prejudice against railroads, hampering industry and killing out the spirit of co-operation, which is necessary to business—the life-blood of every successful nation."

Out of the remarkable speech delivered by Mr. Doherty it is possible only to pick a few of his gems of thought. "There has been too much emphasis on the cost of the finished product and not enough on the value of service. The cry has been to

shave costs to the last cent, to keep rates at the lowest point, no matter how much plants depreciated or service suffered. The results of this penny-wise policy kept railroads from laying a mile of track or adding a new unit of rolling stock at times when the country was enjoying rapid growth. Transportation was sadly out of date and when the crisis came the people suffered untold inconvenience and business lost tremendous sums. For sane, efficient business growth there is one test: Does it create greater values than it takes for itself; does it do more for the consumer than for the stockholder or financier? Do you not think that every large railroad has created values far greater than the wealth of those who own its stocks and bonds? And yet, the political time-servers come and wish to limit valuation to physical equipment only. This little pastime of being a professional friend of the people is an interesting thing. I am watching closely every 'people's champion.' I want to know whether he is going to do something constructive himself or merely give a lot of voters something that belongs to someone else. * * * Great cry was raised against increase of railroad rates. Congressmen forgot that working men rode but little. In some way the debt had to be paid and for every penny saved the poor in railroad fares ten pennies were taken from his pocket through increased cost of clothes and food. When business is persecuted it's the consumer who ultimately pays the freight. * * * There is nothing to be gained by hampering natural growth. The divorcement of the Western Union and the Bell Telephone Company was an economic crime. It came at a moment when the cheapest service ever known was in sight. It was the teachings of these same misguided men that made the separation necessary."

What a tremendously important service would be achieved by the nation if the government would send men of Mr. Doherty's caliber out as financial and industrial missionaries to preach the gospel of business sanity to the people of America. What a step would be taken toward winning the war if the demagogues and the reformers and business baiters were interned, and financial integrity be given an opportunity to be heard. No stronger patriotic impulse has been felt in this community than this plain talk upon business delivered by a man who understands his subject and who is not afraid to tell the

truth. The sentiments expressed by Mr. Doherty were not as spectacular as those used by orators in the Liberty Bond or Red Cross campaigns, but they are quite as important in insuring the perpetuity of the nation and the happiness of its people.

> There are many roads that lead to success but you must watch for them for they do not search for travelers.
>
> —HENRY L. DOHERTY.

Before the Cleveland Conference on War Time Industrial Organization, held under the auspices of the Cleveland Chamber of Commerce, Mr. Doherty made the following analysis of war problems:

R. CHAIRMAN and gentlemen, I don't happen now to be a resident of your Cleveland district, but I was once, having been raised in Ohio as a boy and naturally I feel very much at home.

I am greatly interested in this plan that you men have inaugurated, and I sincerely hope it will be a success—I know it will be a success.

Since we have been drawn into this war, I have devoted every moment of my time that I could to doing war work, trying to help those that were doing war work. Fortunately, my business is one which, in many cases, war activities are dependent upon; that is, we serve over 200 cities with some form of public service—gas, electric light, street railway, or electric power—and in many cases war work is dependent upon our activities. Therefore I have considered it my duty first to keep my own business going at the highest point of efficiency, and then devote what time I can to other war work.

I came out here a short time ago. During the last year I have attempted to speak at but two places—one place was Kansas City, and the other was at Cleveland. Mr. Otis is a friend of mine, and he urged me to come out and talk to the Chamber of Commerce while he was president. I was here on April 9. The work that I did in Washington was to try to help some of my friends in co-ordinating the government work.

I made up my mind while there that I would sooner undertake to go out and attempt to co-ordinate the whole of the balance of the United States than to coordinate those particular departments. I had promised Mr. Otis that I would come out and speak on April 9, which was to be his last meeting. But I was so full of this war work that I couldn't get my mind on anything to say. On the train coming from Toledo, I tried to make a few notes, and I decided the thing I should take up at Cleveland would be whether it might be feasible to get the business men and manufacturers to organize themselves, and try to do war work. Mr. Otis met me at the station, but we rode up town with some other people and couldn't talk things over. We got to the hall ten minutes before the meeting, and he said, "What are you going to talk about?" I said, "I do want to see if it is not possible to get the industrial men to organize, without waiting for the government to tell them when to do it and how to do it, or to do it." He said, "That is a fine idea, only you are about three or four months late on it. We have already started it." I said, "I don't know what I am going to talk about." "Well," he said, "you had better boost that plan." Somebody came along and said, "You will have to wait a while, there is a bigger crowd than was expected." I said, "That is a great compliment." Mr. Otis said, "No, that is simply curiosity." I said, "This is your last meeting, and it is a celebration of getting rid of you."

But I came in and talked to them about this matter of organization. I was surprised and greatly pleased to learn that you have carried it as far as you have. I promised to meet with the Toledo people, and I never had better satisfaction with any group of men. They were enthusiastic in their reception of the plan and unanimous in their adoption of it, and I was able to telegraph Mr. Otis that they had endorsed it, and would cooperate.

I don't pretend to know all, or even much of what is going on in Washington; if anybody will show me the man that does I would like to talk to him. I know that it is very hard to get things done there. I have been an organization man myself, all my life, and I have built not one organization but many organizations, and yet I know that I couldn't work and get results if I had to build an organization of the huge kind that they have had to build in the time available to do it. In fact, my

theory of this whole matter would have been not to throw together a great big organization at Washington, such as they did, but to try to enlarge and work through the existing organizations. I am afraid that they did impair the efficiency of many of our smaller organizations by creating this huge organization at Washington, and, at best, an organization thrown together as that has been, is not an organization until it has been ground into shape, and until men know each other's personal equation and become acquainted; until then it is more or less a mere aggregation.

Now, with one example of an organization among the industrial men that can furnish the necessary things wanted by the government, it can be repeated all over the United States. I am one of those men that believe this—and I have had a great many unpopular beliefs during this war, and I find that I can talk about all of them now, except perhaps one, and not be unpopular—and I believe this, and I think you will agree with me, that America has never won out in anything except in that which was due to her genius for organization and her genius for invention. In spite of her high wages, in spite of no means of training her mechanics with the thoroughness that exists in foreign countries, we have been able to lay down watches in Switzerland, automobiles in any other country of the world, machine tools and machinery in competition with other countries, because we have had a wonderful genius for organization. That is inherent in the American people, as is the wonderful genius for invention. As we have many accomplishments that we can point to and a past record that we can be proud of, why not attempt to lessen the horrors of this war by using that genius of ours? There is no use running down to Washington and saying "What can I do?" You have to figure out for yourselves what you can do, and do it. If you want to have the government tell you, you are just doing what everybody else is doing, interfering with the efficiency of the government, taking the time of men who should be playing thinking parts, and making them play conversational parts. There is always somebody there to get you an interview with anybody, from the president down, and the men that should be doing our thinking are simply playing conversational parts with the men who want to talk with them.

One theory I have always had, if I had a job to do, was to do that job, and to see only men I wanted to see and not see the men who wanted to see me; to write to everybody I wanted to write to, before I wrote to anyone of the men who wrote to me.

Washington started in as a politician's organization. The secretary of the politician tries to shoo everybody off. The man most easily shooed off is the man most valuable to the government, and the man of least value is hardest to shoo off. So there are some real problems to meet, and the easy way that I see to meet them is by your method of organization.

We are very apt as business men to criticize what is being done in this war. Sometimes I think that business men are the men who know least of the temper of the great masses of our people. This war imposes a great burden upon the whole public, and drastic taxation laws are necessary. Things sometimes have to be done by the government and not by existing organizations, and we have always the question of doing that which is the most expedient. I am inclined to think that I, too, knowing that some things could be done with greater efficiency through existing organizations, would probably have hesitated to do so; but would probably have followed much the same course that has been followed by the government. However, I do know this; we have allowed the people of this country to believe that governments are efficient. They are not; there never was a more mistaken idea. Governments are inefficient always, always will be, painfully inefficient. But we have allowed that idea to grow up. We have taught the people of this country that they are justly entitled to benefits from the government—free schools, free libraries, free hospitals, free everything. We have never taught them the necessity of bearing the burdens and responsibilities of government, and we must do it now. We know that our government is driven to its wits' end to know where to get this and that manufactured. I only know of a few concerns, and the tendency is to work those concerns to the point where they can't work economically. So far as you can do it, you are going to provide the government needs and give them good goods at fair prices. I believe that in this work you should always remember that your primary object is to help the government and not to help yourselves. I believe you will go farther and fare better if you do that, and

you will do a great deal to make the people of this country satisfied with the conduct of this war if they believe that the great mass of people of the country are getting a proportion of these war orders at fair prices.

We have had in this country two parties, one believing that we should carry on business as usual, and the other believing that everything else should stop and that there should be nothing but war work done. I think, that whenever you see two people in an argument, you can generally figure out that one of them is wrong and sometimes that both are wrong. I believe in this matter both are wrong. You men must start out with this belief, that, first, all of your facilities must be devoted to government work so far as the government needs them. Beyond that, your facilities must be kept busy, because nothing represents such great waste as idle labor and idle facilities. You have the basic platform there on which to stand.

I wish I knew just what to say to make every one of you just as enthusiastic as possible about this Cleveland plan. This plan should be open to anybody, and so far as it is developed, it should be made available to everybody. You should say to everyone, "You can come here and get the information, or we will send it to you." As I have been unable to attend to this matter personally as I should, I delegated the matter to one of our men, Mr. Strobhar, who is a very enthusiastic and patriotic man, and I know he will be as willing to work as many hours without sleep as any one else. I have delegated him to help you just as much as he can. He has continually said to me, "How are we going to make contact with the government?" Now, there is no such thing as contact with the government, using the word in the singular. There are contacts, they are numerous, they change so fast that after you have educated one particular man, you may find that he has been changed over to another position, and you have another man to educate. I expect to have a talk with your chairman, Mr. Foster, this afternoon, and see if I can be of any practical help to him by any suggestions that I might make, after having viewed closely some of the government operations. But one thing I am going to recommend to him; namely, that you go to Washington and use a certain amount of display advertising space, as the only means to reach the men that are connected

with and have the say as to how and where the government shall purchase its goods. Very often we go to the man that has the title. They tell a story in Washington which I think has a good bit of humor and common sense in it. It is one of the things we can remember and that makes us realize sometimes what will happen when trying to deal with one who has merely the title and the position. A new officer was elected. He was there but a short time when one day a darky came in with an official paper. The official said, "What is this?" The messenger said, "I don't know, boss, but you sign right on this line." In other words, the official has an organization under him, and they are the men that do things. I know that a series of advertisements put in the Washington papers would reach every man in the government, and when they thought of getting anything built they would think of this district and this organization.

I want to say one or two things that are very close to my heart. You have it in your power to put at the disposal of the government all of your genius for invention and organization. I still feel that one thing I am going to express to you as a matter of illustration is one that you are probably not ready to accept; it has made some of my friends so angry with me that they didn't have any use for me for several days. I love to ask a boaster whether he will make good, and I am tired of hearing these men boast of what they are going to do in this war, when the only thing they are going to do is to spill the blood of their neighbors' sons. They tell us that one American can whip a German regiment. I don't think he can whip a regiment, or ten Germans, or three, I don't think he can whip one of them. The German people have been trained to the military idea, they have studied books of warfare, and they have fought, they have it embodied in their bones. Our people haven't. If you give the Germans equal facilities and equal munitions, and plenty of war material, as against every other nation that I know of, they are the worst dubs on earth if one of their men is not more than equal to one of any other nation, for it means that all their lifetime has gone for nothing. It would be surprising indeed if any one nation could equal the work of the German nation, raised as they have been on militarism. Since industrial warfare is becoming more and more a matter of the shop and not of the field, if we men who

are running these shops can give our men better equipment than the Germans have, equipment that fills their needs—I believe we will win this war easier, especially if we introduce new war inventions.

That brings me to the matter of inventions, which is very close to my heart. I had a German try to tell me once of the wonderful superiority of everything German against everything American. My hosts were trying to be courteous to me, but they were insulting me all the time by showing me that their country was superior to everything on earth. Every bromide in the country has gone around for years talking about German efficiency, and we have helped swell their heads. I remember one day a man took me around to the shops to show me how efficient the Germans were, and I didn't see a single machine tool that wasn't American made or English made, or else an absolute copy of one of our machine tools, and I didn't see a single piece of efficient conveying apparatus that wasn't originally American. The adoption of the American ideas was evidenced on every side.

We have one situation that is a critical one as far as inventions go. Upon the outbreak of this war, every nut and every bug had an idea of just how submarines were going to be sunk, and how many other things were going to be done. They made such a number of foolish suggestions that the government was swamped with them and has grown suspicious of all of them. Thousands of inventions have been sent in, showing how to catch submarines with electro-magnetism, the commonly accepted form of electro-magnetism, where the field is of such limited scope that the advice they were giving to the government was just as practicable as the advice we used to get as children as to how to catch birds, by putting salt on their tails. Our government has become intolerant as to inventions, although they are our great opportunity to win this war. In many cases we have the inventive talent of other countries, whose people have come to our shores because they thought they would have a better opportunity here. One reason why inventions are not being used is because of the number of impractical suggestions, and another reason is this—a government official can't attempt a new invention or innovation of any sort, without submitting himself to the most bitter criticism

if it proves a failure, nor can he turn it down, because if it afterwards proves to be a success he is criticised just as much. So they just string it along; they fill the hotels and the railroads and take up their own time sending a man from department to department. How we are going to give this inventive genius an opportunity I don't know, but it must be done, and the sooner the better, because it will mean a great reduction in the loss of life and in the cost and duration of the war.

The exact plan of the government as related to buying is rather indefinite, and that is one reason why I am advocating to you that you try to reach the government officials by display advertising space, because you want to reach every man, you want to reach the man who sent the negro to get the official's name signed. They all read the papers down there.

We have so many people in Washington that have to be consulted. For instance, we oil men—I happen to be also an oil man—we oil men are subjected now to the supervision of the Oil Administrator, who in turn is a branch of the Fuel Administration. We must go to them to get our tank cars moved, and, incidentally, they are moving now at about half the speed they did before the government took over the railroads. There is such a ramification that the men who think they can go to Mr. Ryan or Colonel Tripp or some other man, and be put in contact with the Washington situation, find they can't do it. You want to convince them that while human efficiency is generally only up to three per cent, you are up to four. Get them to send out here samples of what they want made. There are many able manufacturers to whom a drawing doesn't mean much, but a sample does.

Somebody asks, "How are you going to divide this work equitably?" I say to you, don't think that you are organized to get business. It is not a question of dividing it equitably, because you will be all running full, and it will be a question of what you will reject.

I think, after hearing this conversation, that one of the things you need, Mr. Chairman, is perhaps a permanent committeee on classification, and it looks to me as though there are going to be a number of things manufactured here that you don't know yourself, and you want the Washington people to know of all those things.

Before I sit down, I want to leave just this one thought in your minds. What are we going to do about inventions? In much of this work you men have to go down in your pockets for doing things of that sort. I hope that every man here for once in his life won't be a piker. Thank you, gentlemen.

> Any community that tried to depend entirely on its own resources, that tried to finance every deal itself and did not go on the outside and induce capital to come in, would never get very far.
>
> Outside capital means new blood, new life—more people and more money in the city.
>
> The great cities of the West have been built because the eyes of eastern capital were turned toward them.
>
> —HENRY L. DOHERTY.

Mr. Doherty had been made a member of the National Petroleum War Service Committee when it was established, and was made chairman of the Committee on Taxation. An analysis of the tax problem confronting the oil producers was prepared by him and sent to editors of many leading newspapers in September, 1918, which said:

THE National Petroleum War Service Committee is an organization composed of the leading men of the oil industry, selected originally by the Council of National Defense, and later reorganized by the Fuel Division of the United States Government. It is patriotic in character, and organized to assist the Government in its war problems so far as the production and supply of petroleum and its products are concerned.

This Committee views with great alarm the discouragement of oil production which has been brought about by the existing

Revenue Bill, and views with still greater alarm the effect of the Revenue Bill recently passed by the House of Representatives and now pending before the United States Senate.

The oil men of the country naturally hesitate to appear to be opposing any feature of a war revenue measure, and yet they feel they would be derelict in their duties should they fail to give a reasonable warning to both the Government and the public of the disastrous results which this form and character of taxation may cause. We are therefore frankly inviting discussion of the matter by the press.

The great majority of the members of the National Petroleum War Service Committee are interested primarily in the transportation and refining of oil. To the extent that these interests also own producing properties their properties have almost universally been acquired by purchase from individual operators or companies which regularly follow the practices of propecting for oil—which is termed in the oil business "wild catting."

In last analysis the entire production of petroleum oil is dependent upon wild catting. The wells and fields we now have will sooner or later be exhaused and the ever-increasing needs for petroleum and its products must be supplied by the discovery of new pools.

For the production of oil our country is now dependent upon approximately 25,000 oil producers and prospectors. These are the people who will be injured and discouraged by the present Revenue Bill, if passed in its present form, or who will be benefited if it can be modified so as to encourage wild cat operations.

It is true that the larger companies have a partizan interest in the matter in so far as they must have oil to fill their pipe lines and for the operation of their refineries. It is not, however, this partizan interest which primarily causes them to issue this word of caution.

This is best evidenced by the fact that while the transportation and refining of oil is hazardous in character, and while a business of this hazard cannot be justly expected to pay the same tax as is levied on eminently safe business ventures, yet the oil men of this country are making no plea for any consideration other than for the production end of the business—and this only because they feel that the Revenue Bill, if passed in its present form, will inevitably lead to an oil famine.

We do not ask others to accept our opinion upon this matter except as they may reach the same conclusion after an investigation of the facts.

What would represent in an ordinary line of business staggering losses on one end and huge profits sometimes on the other end is the normal condition of the oil production business.

In prospecting for oil the operation is apt to be a loss of 100 per cent. Now and then a lucky strike is made which brings in huge profits. Each lucky strike has heretofore added new recruits to the huge army of oil producers and prospectors.

The Government now proposes to levy a heavy tax on all companies having large earnings in relation to their actual "investment capital" or the earnings of the pre-war period. "Invested capital," according to the terms of the Bill, cannot exceed the actual cash put into the business—and may under the terms of the Bill be much less than this.

In most cases the prospector who has been lucky enough to strike oil will be allowed to earn 10 per cent on his actual cash investment and then the Government proposes to take 80 per cent of all the remainder as a war profits tax, and then of what still remains to take 12 per cent if it is paid out in dividends and 18 per cent if not paid out in dividends.—In most cases no earnings can be paid out as the money will have to be used for the development of the property.

Representatives of the oil producers were given a hearing before the Ways and Means Committee, but no relief was promised. The National Petroleum War Service Committee did not appear before the Ways and Means Committee as they had no facts which were not presented by the individual representatives who appeared.

Numerous appeals were made by the individual oil producers to the National Petroleum War Service Committee and, believing that we should take some action in the matter, we retained Judge J. H. Covington, of Washington, D. C., who appeared before the senate Finance Committee, and who was given about twenty minutes to state his case.

Since our country was drawn into the European War the situation regarding crude oil has gradually changed from a normal condition to a rather uncomfortable condition—and has now reached an alarming condition.

The difficulty of securing oil well material, the high price of same, the difficulty of getting money, the high price of labor and the difficulty of securing labor, the difficulty of prompt transportation, and the withdrawal of men due to the draft, have all had a retarding effect.

In addition to the above the existing Revenue Bill was passed, and was made retroactive in effect. Probably the results are not generally known, but discouragement to wild catting has been widespread. Several pitiful cases have been reported to us where men who had made their lucky strike and supposed they had made a fortune found themselves practically bankrupted.

Up to the time of the passage of this Revenue Bill wild catting was going on practically throughout the country—which might be likened almost to a combing process. After the passage of this Revenue Bill fewer new ventures were started, some of those under way were abandoned, and it looks as though practically all wild cat operations will cease.

This not only is a serious matter from the standpoint of future supplies of crude oil, but is also already playing havoc with the supply of natural gas.

Natural gas might be considered in the nature of a by-product of oil exploration. It seldom pays to prospect for natural gas, and the huge investments in natural gas supply systems are dependent upon wild cat oil operations for the location of natural gas pools.

Few people realize the extent that we as a country are dependent upon natural gas. Of all the cities, towns and villages supplied with gas at all more than 50 per cent of them are dependent upon natural gas. A diminution in the supply of natural gas means an added drain on the coal mines and an added load upon our railroads, while the pipe line transportation facilities capable of carrying fuel in the form of gas equivalent of thousands of tons of coal are utilized to a smaller and smaller percentage of their capacity.

It seems obvious to us that the theory on which the proposed Revenue Bill is based cannot be applied to the oil production business.

The men who follow the business of oil prospecting are as game a bunch of men as ever lived, and are natural optimists—and I suppose they might be characterized as gamblers. They

have all learned to tackle and try to overcome obstacles, because disappointment is the rule rather than the exception in their business. Many of these men have remained at the work believing that congress would change the present revenue bill as soon as it was realized what a hardship it was to them. To pass a new bill even more drastic in its terms will remove the last vestige of hope. They are willing to face the handicaps which nature supplies in abundance, but they cannot play a game where they must take 100 per cent of the loss if their venture proves a loss—and that 100 per cent in actual dollars represents two and a half times as much as it did three years ago—and yet, if they win, 80 per cent of what they produce is to be taken away from them.

They cannot continue as oil prospectors and producers. It is not a case of won't but a case of can't. They are not going to sulk, for they are not built that way. They will take their medicine without much protest, and will simply turn to something else for a livelihood. While they will be hurt, the public will in the end be the real sufferers.

We not only must maintain our oil supplies at least equal to what they are now but we cannot much longer continue to draw on our stocks. We have never had enough oil above ground and in storage to represent a six months supply. The present supply is now approximately equal to four months of our market demands.

The crude oil is of vastly more importance to the Government and to the public than the money which will accrue to the Government by this drastic tax—in fact, the very nature of the tax is one which will automatically bring about its own reduction.

The Oil Division of the Fuel Administration regards the present oil situation as so threatening that work is already under way for the rationing of petroleum products. This would be entirely unnecessary under a policy of encouragement by the various branches of our Federal Government.

While no one of us can say just how much crude oil can be produced in this country, I see no reason why we cannot expect to have an abundance for everyone and for every purpose for many years to come.

The oil producers do not ask to be exempted from taxation, and they are willing to bear all that the business will stand; but

they do not want a theory applied to their business which is obviously inapplicable. They do not want to be called upon to pay what in their case is a property tax while other lines of business pay only on their profits.

The man who perhaps after forty years of industrious search brought in an oil property after March, 1913, is expected to pay on the crude oil produced from his property the same tax as it paid by the maker of war supplies. If this period of heavy taxation is a long one he will find his property exhausted and useless before the period of heavy taxation ceases, while the maker of war supplies will still have his plant and all of his plant's equipment to turn to some other purpose when the war is over and it will still be capable of making profits for him. The oil producer will have neither a plant, raw material, nor much capital, for the Government will have taken practically all of it away from him.

He is not making war profits, and when the war is over and the concerns which are making huge profits from the war have ceased to make these profits, and have ceased to pay taxes to the Government, the oil producer, if he is still producing oil, will still have to help wipe out the remainder of the Government debt.

The big industrial undertakings are not expected to liquidate and sell off their plants, property and equipment and cash them into profits so they may pay Government taxes. By the very nature of the business the oil man is compelled to do this.

The oil producer asks only that he be allowed to deduct from his gross income a sufficient fund to either find or buy reserve stocks of oil in the ground equal to that which he withdraws during every taxable year. In other words, he is willing to pay a tax on handling his raw material to the point where he markets it, and asks only that he not be compelled to lessen his property holdings and pay 80 per cent of the value of that to the Government.

He also asks that when he locates an oil producing property that he be allowed to sell it to the large oil companies, who have the funds and the facilities for its development, without paying 80 per cent of the difference between the cost of making his lucky strike and the selling price.

The whole oil industry joins in asking that this be done, because the wild catter seldom has the capital to develop his prop-

erty and so long as his capital is tied up in the property he has found he neither has the opportunity nor the capital to go out and search for new production property. His inclinations; his instincts and equipment are those of the prospector and it is better for everybody from the prospector himself to the ultimate user to make it possible for him to sell his property.

So much for that part of the Revenue Bill which directly affects the producer. Let us turn to another phase of the impending bill.

The oil men of the country feel that it is unfair in a revenue bill, the theory of which is to lay consumption taxes only on luxuries, that a consumption tax should be placed upon gasolene.

The boast that the breakfast table is not taxed is a good argument as far as the city dweller is concerned, and is true of many of the families in the rural communities, for kerosene has largely been substituted for the gasolene stove; but many hundreds of thousands of gasolene stoves are still in use and to the extent they are used to cook the breakfast there is that much of a tax on the breakfast table. However, it is not of vast importance for the bulk of the gasolene is used for industrial and agricultural purposes.

Some gasolene is used for pleasure riding, but this, while an increasing amount each year, is a lesser and lesser percentage of that produced. Gasolene is the great conserver of manpower—and must still further be substituted for manpower, and especially on our farms. We can think of gasolene as a food product for it has today taken place of what was food for horses almost yesterday, and this substitution—which has gone on during the past few years of gasoline for horse food has been a great factor in permitting our farms to feed our own people and our allies in this crisis. It is probably an 85 per cent essential commodity and a 15 per cent pleasure commodity.

A large portion of our coal is used to heat private flower conservatories—and it would probably be a surprise to know how much of even coal is used purely for pleasure purposes—yet the mere fact that some coal is used for pleasure purposes does not cause it to be placed in the class of taxable articles.

Gasolene when once firmly fixed in the class of pleasure taxable articles is apt to be subject to heavier and heavier taxation, to the detriment of the industry.

We take from the ground a crude product which naturally carries gasolene, kerosene, lubricating oils, waxes, and fuel oils. A market must be found for these products which corresponds to the percentage in which nature has produced them. Any artificial load on any of these products which lessens the market for it prevents it from contributing its share of the revenue needed to carry on the business and produce petroleum products in the abundance necessary and at the lowest cost to the final user.

Respectfully submitted,

HENRY L. DOHERTY,

Chairman Committee on Taxation,

National Petroleum War Service Committee.

Men and capital could probably be found to build these railroads if they could have some of the profits they would create, but they are told by self-styled dictators of public thought that they can have nothing but a nominal rate of interest on the actual physical value of their property. And then we wonder why the country doesn't grow and prosper as it should.

—HENRY L. DOHERTY.

There were few, if any, provisions of the 1918 tax law, as proposed, more dangerous or ill conceived than that treating of the oil industries.

It was not a question of the great refineries or the oil carrying pipe line companies, but of the orginal producer and prospector. The proposal to grant him a 10 per cent exemption was wholly insufficient to allow him to go on. As Mr. Doherty, spokesman for the oil industries, truly pointed out, it was not a question of "won't, but can't."

One trouble with an oil well is that it is not immortal. It runs out in time, and when that happens there is no property of value left. As Mr. Doherty said, speaking as chairman of the Taxation Committee of the National Petroleum War Service Committee:

HE production end of the oil business is different from the ordinary business. The oil producer is really selling off his property. He is compelled to liquidate his property. When his wells are exhausted his property is gone. His assets are also gone. He has in reality paid a property tax instead of a profit tax. Other industries have their plants left which are still capable of earning profits. If required to pay such a tax as suggested, even under the amended bill, the oil producer is out of business without enough left of the value of his property to continue in business. The men in the oil business can be depended upon to do everything in their power to supply our needs for petroleum products for domestic and war purposes, but if the situation becomes more acute and reaches a crisis, it will be due to a drastic tax program which dried up the source of raw material. We are not really asking that the oil producer be favored, but that the distinction between the oil production and other lines of business be recognized.

"Nor is exhaustion of the opened well all of it. The prospector in his hunt for new supply must experiment. He may have to sink a good many wells before he gets one that pays. The expense of this is considerable and the business is hazardous. When he does get a good well the profits—from that particular well—are large, but he must charge up losses on others before he has a real profit.

"To tax him 80 per cent or anything like it on "excess" profits from a single well is simply to drive him out of business. A 10 per cent exemption is not enough. The measure as framed now would simply stop the future flow of oil, to the immense loss of the consumer including the government itself. There is still time to amend it into rational form. We must have oil at any cost."

> The man who loafs on his job seldom punishes the employer as much as himself.
>
> —HENRY L. DOHERTY.

At the meeting of the United States Chamber of Commerce in Atlantic City late in 1918, a month after the Armistice was signed, Mr. Doherty was one of the principal speakers. The Philadelphia Public Ledger reported his reception as follows:

ATLANTIC CITY, December 3—Before the petroleum section, United States Chamber of Commerce, this afternoon H. L. Doherty, of New York, evoked a roar of applause when he said:

"I do not believe in government control or government ownership. Government operation is inherently inefficient. If we are faced with government domination of business it will be our duty to go back over the records and show what has occurred under government operation during the last year and a half.

"We have ourselves to blame because business men have left the shaping of the thoughts of men in this country to the radicals and to the magazines. We have got to change our attitude and do our share in the shaping of public opinion if we confine our efforts to our employes only.

"We have attained in this country to a degree of paternalism never contemplated under a constitutional government. It was Jefferson's view that the government which governed best was the government which governed least. If there is any considerable sentiment along this line remaining in the Democratic party of the present I should like to have it indicated to me. What we need now is not revolution but evolution, a movement to release the government from any dominating influence or control of business at the earliest possible moment."

The really big man looks for net results, the small man splits hairs.

—HENRY L. DOHERTY.

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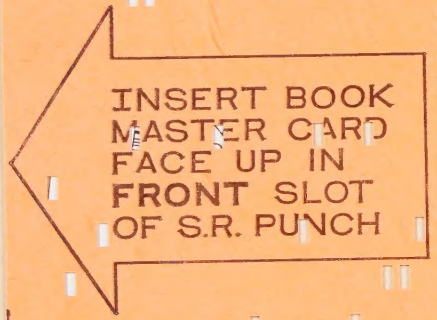

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